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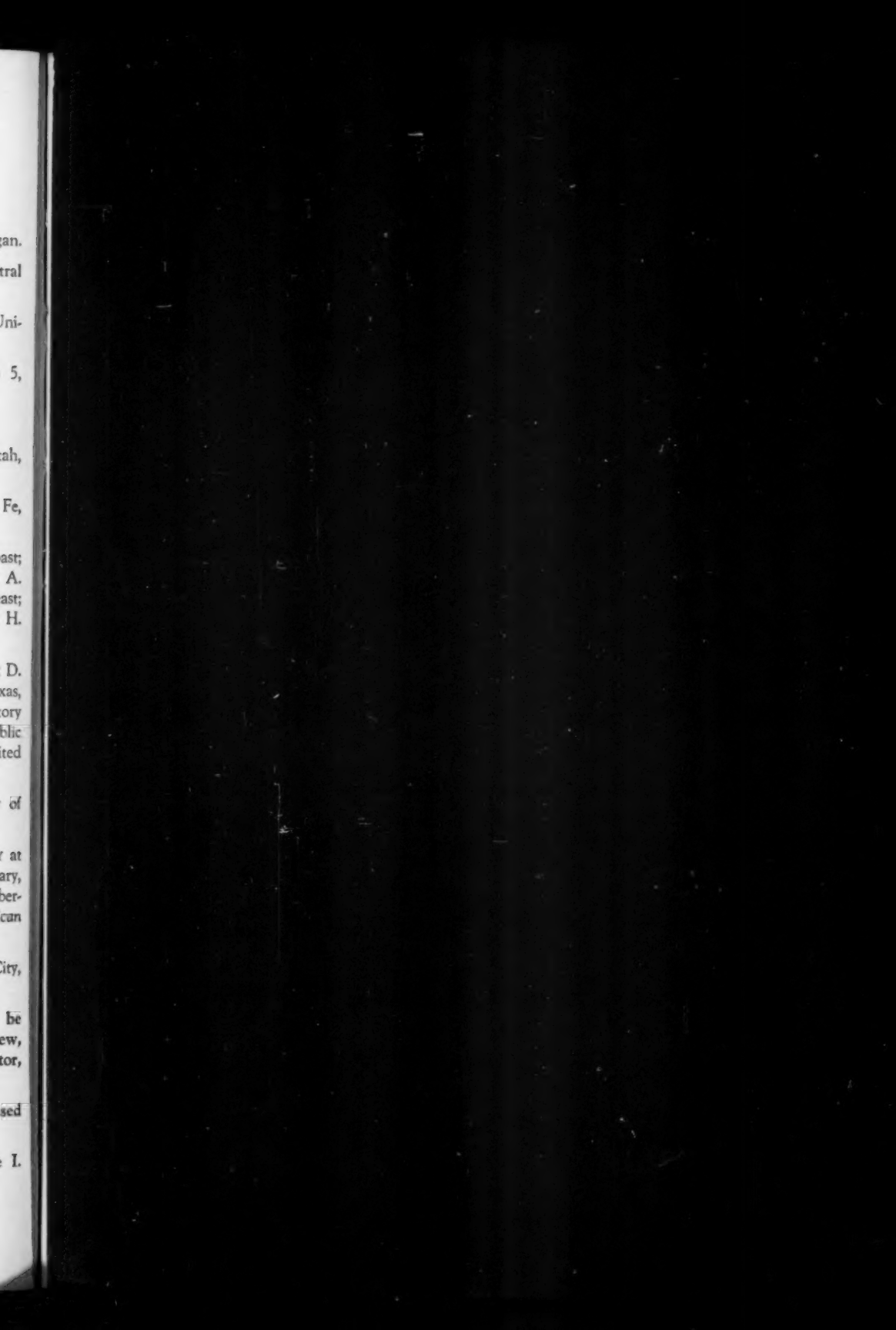

AMERICAN ANTIQUITY

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PREHISTORIC WATER SOURCES OF THE POINT OF PINES AREA

JOE BEN WHEAT

IN THE COURSE of an archaeological survey of the Point of Pines area, San Carlos Apache Reservation in east-central Arizona, E. W. Haury and E. B. Sayles, of the University of Arizona, noted the presence of a number of depressions which held surface water for a considerable period of time beyond the normal time for runoff. Furthermore, these depressions, or basins, appeared to be associated to some extent with specific archaeological ruins. The possibility that these depressions were made by the aboriginal inhabitants for the purpose of establishing and maintaining a water supply, led the writer in 1948 to excavate several of the depressions to determine their nature and date of construction, length of usage, time of abandonment, and other cultural information. The work was carried on during the 1948 season of the University of Arizona archaeological field school.

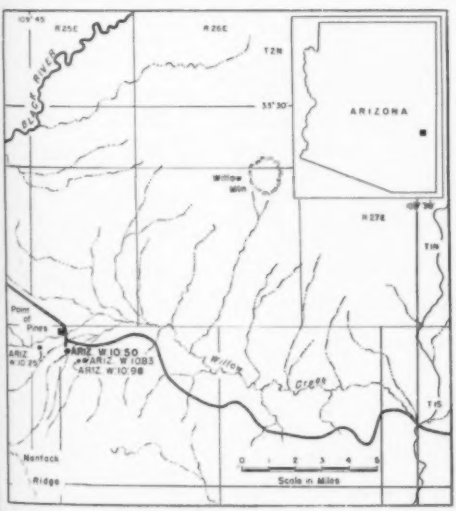


FIG. 59. Map showing location of reservoirs and walk-in wells. Inset shows location of Point of Pines area in Arizona.

The Point of Pines archaeological area is located in east-central Arizona on an elevated intermontane plateau, bounded on the north by the White Mountains and on the southwest by the Nantack Ridge. This ridge is a part of the mountainous zone which, trending from northwest to southeast, separates the Colorado plateaus from the basin and range physiographic province to the south. This intermontane plateau is drained by two main streams separated by a low divide. The more northerly part is drained by Black River which, flowing generally westward through a deeply entrenched channel, joins the White River to become the Salt River. The southern part, with which we are at present concerned, discharges its waters through Willow Creek into Eagle Creek and eventually into the Gila River.

Geologically, the area is little known. The Nantack Ridge is of Tertiary volcanic origin and provided a range of igneous rocks which formed a useful inventory of materials for aboriginal exploitation. Basalts and tuffs were used for building and for making some of the heavier tools such as metates, manos, axes, and others. Obsidian was used for many of the projectile points, knives, and other chipped implements. The plateau proper seems to be underlain, at least in part, by nearly horizontal lava flows which are covered to various depths by a reddish clay overlain, in turn, by recent alluvial deposits.

The higher ground of the Nantack Ridge and the foothills along its base support a dense growth of pine, juniper, and other trees, which give way to a tall grass prairie covering the floor of the plateau. Dissection of the lower, more nearly horizontal reaches of the piedmont has, in some places, resulted in the formation of long ridges fingering out into the flat prairie land. It is on these ridges, usually just along the transition from forest to prairie environment, that the majority of the archaeological remains occur. The water retaining basins,

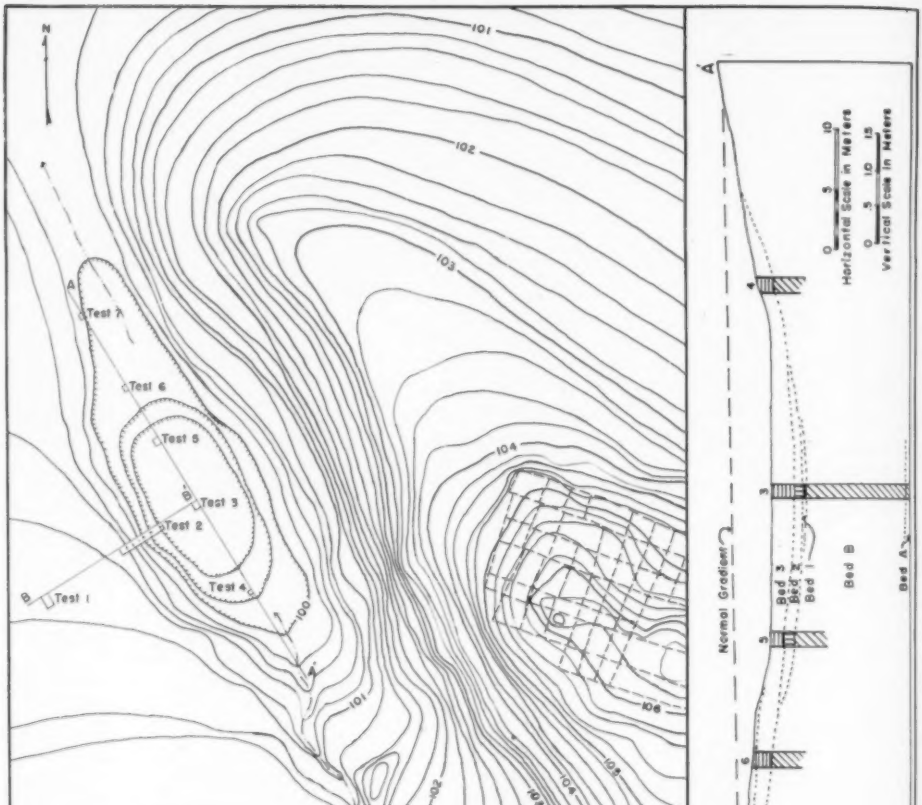


FIG. 60. *a*. Contour map of reservoir, Arizona W:10:83; *b*, cross section of Arizona W:10:83 along A-A'; *c*, cross section of Arizona W:10:83 along B-B'.

which upon investigation proved to be of two varieties, are (1) broad open basins found within the stream channels near a major site, and (2) small confined basins a short distance out into the prairie where they are adjacent to, but not within, shallow channels or swales.

Two of five sites tested were of the broad open basin sort and proved to have been used as reservoirs for surface runoff water. Two of the remaining sites were wells which had been excavated in such a manner as to tap subsurface water. The fifth, while located in a fashion similar to the well sites, appeared to be a modern excavation. This became evident when it was discovered that the excavation had apparently been made with a shovel, following a plan different from that of the Indian wells, and had been intentionally refilled, perhaps because it developed insufficient water. Further evidence of its recency was the discovery of an undecayed juniper log which had been cut with a steel axe, and the almost total absence of potsherds or other Pueblo material culture. Because of this, it will not be further considered here.

The first site to be discussed is a reservoir situated adjacent to Arizona W:10:83, an unexcavated Pueblo IV ruin of about 60 rooms (Figs. 59, 60, *a*). This pueblo is located on the northern end of a low, broad ridge stretching away to the south and east toward the Nantack Ridge with which it merges. South of the ruin a small intermittent stream flows down and across the ridge scarp, then northward along its foot and out into the valley where it finally joins the main drainage system. Immediately below the ruin the stream channel has been widened and deepened below its normal gradient to form a basin some 50 m. long by 22 m. wide. Thus a reservoir is formed which still conserves runoff water well into the dry season.

In this and the following site discussions, strata or beds having regional or areal distribution will be designated by capital letters, while those localized within the basins will be numbered, the oldest or deepest stratum first.

A series of seven test pits was excavated to determine the nature of the construction of the basin and its stratigraphy (Fig. 60, *b*, *c*).

Bed A, which consists of dense, pebbly, yellowish clay, and bed B, a brownish adobe clay, underlie the basin, the latter forming the matrix into which the reservoir had been excavated by the Indians. Both beds are culturally sterile.

Bed 1, of sandy, yellowish clay, and bed 2, of dark gray, gravelly clay, were accumulated during use of the reservoir and contain numerous potsherds and cobbles.

Bed 3, a dense clay, dark brown in color and containing a few scattered drift potsherds, forms the floor of the present basin and has been largely deposited since the abandonment of the area by the Indians.

Bed C is an unconsolidated sandy silt topsoil being deposited at present throughout the valley and gradually encroaching upon the basin proper. It contains a few drift potsherds.

The construction technique followed by the Indians was basically the widening and deepening of the small stream. If the capacity of the basin had been increased by an embankment, there was no evidence remaining. This raises the problem of the disposal of the earth removed during the excavation. Since much adobe clay was used as mortar in the building of the adjacent pueblo, it may be that the basin served as a borrow pit. Whether the securing of adobe for construction purposes, or a basin for water storage, was the primary objective, it is clear that the resultant depression was used as a reservoir.

The second reservoir lies in an embayment between two parallel northeastward trending ridges upon which are Point of Pines ruins of the late 14th century (Wendorf, 1950, Pl. 2, *b*) numbered Arizona W:10:52 and Arizona W:10:53, while about 100 m. to the north on an offset continuation of the westernmost ridge lies the largest ruin in the valley, Arizona W:10:50 (Figs. 59, 61, *a*). This ruin has a much longer history of occupation. To the south and west of the reservoir, the area between the eastern and western ridges forms a small catchment basin, 200 m. wide at most, and nearly half a mile in length. Precipitation falling in this area empties directly into the reservoir through a shallow swale terminating in the basin.

Draining a much larger area is an ephemeral stream which flows along the eastern flank of the eastern ridge. The course of this channel runs northwestward around the end of the ridge and across the alluvial flat to the eastern flank of the western ridge where it is deflected northeastward past the foot of the ridge con-

FIG. 61, *a*, Contour map of reservoir, Arizona W:10:50-52-53; *b*, cross section of Arizona W:10:50-52-53 along A-A'; *c*, cross section of Arizona W:10:50-52-53 along B-B'.

taining Arizona W:10:50, and finally joins the main valley drainage system. During its history this stream has, as a result of overflowing its channel, built up bordering levees so that its banks slope away gently to the north toward the valley and to the south toward the reservoir. Today, water which overflows the southern bank enters the reservoir through an eastern and a western channel but little below the grade of the small meadow that separates them. Sediments carried by the overflow are dropped from suspension due to the slackened speed of the water and are rapidly encroaching upon the basin.

The basin itself is a rectanguloid depression some 60 m. across both its major axes. Because of its situation adjacent to three pueblos, and also because of its artificial appearance, it was presumed to be a man-made reservoir.

Six test pits reveal the following beds (Fig. 60, *b*, c): Bed A is a reddish-orange pebbly clay into which headward and lateral erosion of the stream draining the catchment basin to the south have carved a rectanguloid embayment. Bed B consists of clays containing water-carbonized plant parts laid down in small ponds incised into the floor of the stream channel. A change in stream regimen initiated deposition of sands and clays (bed C), the upper surface of which formed the floor of a natural basin. Beds D and E are deposits of sand and gravel laid down by the main stream whose continued aggradation resulted in the raising of its base level and the deposition of natural levees. The eventual extension of these levees across the mouth of the embayment dammed the flow of water from the catchment basin and formed an elongated basin. All of these beds are culturally sterile.

The topsoil of the catchment area south of the reservoir consists of sandy silt, deeply stained by humic matter (bed F). That this bed has been deposited since the time of the Indians is indicated by scattered potsherds through it.

Into the deepest part of this natural reservoir the Indians dug a small, deep depression, probably to serve as a collecting basin during low water. The excavated earth was dumped to the north, perhaps to form a low embankment. Bed 1, a dark brown gravelly clay, fills this depression and is overlain by bed 2, a brownish clay. These two beds were deposited during the actual use of the reservoir by the Indians and contain numerous potsherds, stones, and broken artifacts. Bed 3, a dense, dark brown clay forming the present floor of the basin, contains a few drift potsherds and is mainly post-occupation in time.

Bed G is composed of layers of silt, sand, and small gravel, deposited as an alluvial fan southward from the main creek and gradually filling the reservoir basin. It is sterile of cultural remains.

It appears from the foregoing that the origin of the basin was primarily natural, but that its later history is closely bound to its exploitation by the Indians.

Having ascertained the nature of the large reservoir basins, we next turned our attention to the smaller depressions which, while also holding runoff water after rains, differed from the larger ones in being located near to, but not in, the stream courses. This type will be designated by the term *walk-in well* in this paper.

Arizona W:10:98 is located in the open prairie on an alluvial fan, about 200 m. northwest of Arizona W:10:83, to which it presumably belonged (Figs. 59, 62, *a*). To the south and west the land rises to meet the dissected edge of the piedmont of the Nantack Ridge, while to the north it slopes gently fan-wise toward the center of the valley. Some 25 m. west of the basin is the course of the present main tributary creek which, during the history of its lateral shifting, has built up the flat alluvial fan into which the well was dug. Between this creek and the basin is a shallow swale whose overflow has cut a small channel into the basin. An oval depression about 16 m. x 20 m. in diameter and approximately 50 cm. deep marks the site itself.

A single test trench 1 m. wide was excavated completely across the center of the basin and into the culturally sterile matrix on either side in order to obtain a complete cross-section (Fig. 62, *b*). The following beds were exposed:

Bed A, a dense, pebbly, reddish-yellow clay, is overlain by a stratum of relatively soft yellowish clay (bed B), and this in turn by a series of interbedded layers and lenses of silt, sand, and gravel (bed C), which undoubtedly acts as the aquifer for the well. None of these beds contain cultural material. Bed D consists of mixed sandy silt containing

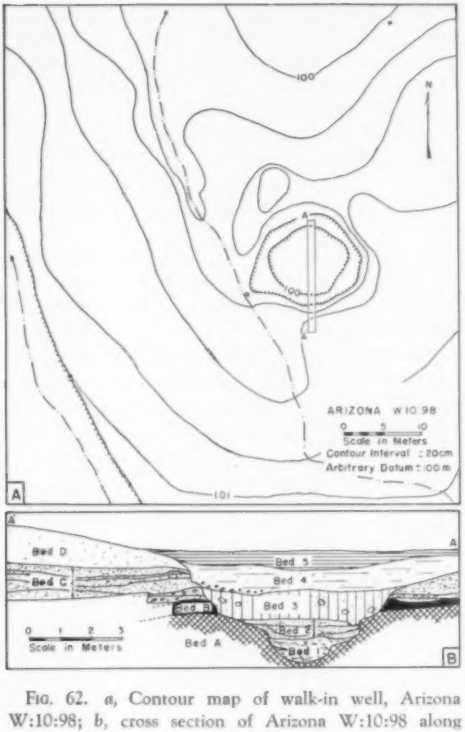


FIG. 62. *a*, Contour map of walk-in well, Arizona W:10:98; *b*, cross section of Arizona W:10:98 along A-A'.

a few scattered potsherds and is still accumulating today.

The well was excavated into this valley fill, truncating the natural strata. Within the well a series of five beds has been deposited. Bed 1 is a black muck deposit consisting of saturated silt and clay with much decomposed organic material. As this bed accumulated, depressions large enough to dip from were dug into its upper surface, no attempt having been made to clean it out completely.

Bed 2 consists of reddish-yellow, gravelly sand into which small dipping basins had been dug and filled with finely laminated silts. Over this bed is a thick accumulation of dark brown, sandy silt (bed 3). Beds 1, 2, and 3 were accumulated during the use of the well and contained many boulders, cobbles, and potsherds.

Bed 4, a light brown clay containing a lens of gravel, underlies bed 5, a dense, dark brown clay which forms the floor of the present basin.

The location of the well alongside an old stream channel and in an alluvial fan suggests that the Indians dug the well in an attempt to utilize the subsurface flow of water. Even after a long dry season, water still flows along the top of the impervious native clay and into the collecting basin excavated into it. Runoff water may have been utilized also, but the primary source seems to have been subsurface. Furthermore, the overflow water probably would have polluted the otherwise filtered pure water.

The profile (Fig. 62, *b*) shows that the well was excavated to form a steep-sided basin, cut down in a series of steps, each presumably circular and concentric, or forming a spiral ramp, and terminating in a deep, narrow collecting basin. Boulders in the fill may have been used as supplementary steps down into the well.

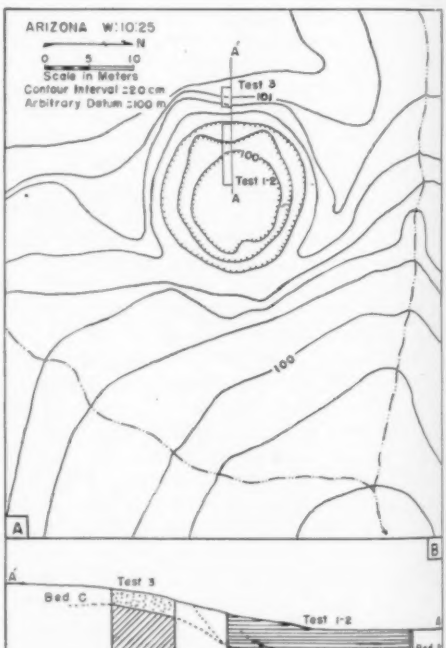


FIG. 63. *a*, Contour map of walk-in well, Arizona W:10:25; *b*, cross section of Arizona W:10:25 along A-A'.

Arizona W:10:25 is located on an alluvial fan about one mile southwest of Point of Pines Ranch, at the apex of a tongue of prairie which extends westward toward the Nantack Ridge (Figs. 59, 63, *a*). Pine forest covers the higher land to the north, west, and south, while to the east the land slopes away into the Great Circle Prairie. To the north rises a ridge, upon which is located a late site, while paralleling it along its southern flank is a recently cut arroyo. There are also earlier sites adjacent to the basin.

Two shallow channels originate within the forest to the west, join and flow east to become lost on the prairie. Between and immediately above the confluence of these swales is a depression about 16 m. long on an east-west axis, cut into the alluvial fan at its upper end. A low embankment closes the lower side of the basin.

Four test trenches were dug to ascertain the stratigraphy. One test was initiated to transect the embankment forming the lower boundary of the depression but was abandoned when it was learned that the Double Circle Ranch had rebuilt this part of the basin during the early years of this century.

Three strata constitute the matrix into which the well had been excavated (Fig. 63, *a*). These are: Bed A, a compact residual clay, orange-yellow in color, underlying bed B, which is an indurated, yellowish, water-deposited clay. Neither of these beds contains cultural remains. Bed C is a loose, sandy alluvium with potsherds scattered through it, indicating that it has accumulated since man came into the area.

Of these strata, bed C is the only one of sufficient porosity to have served as an aquifer. Inasmuch as it has obviously been deposited since the Indians arrived, this poses the problem of the source of the water collected in the basin cut into bed A. It is possible, of course, that suitably porous beds may occur laterally, or even below; but since our excavations did not explore these areas, the problem remains unanswered. In this connection, however, it may be noted that during the excavation of test 1, at the center of the basin, water could be observed bubbling from the north and south sides of the pit, so it seems likely that aquifers enter the well from the sides rather than from upslope where the tests were made.

While the fill of the well may be differentiated into nine strata, it is more convenient to treat them as two beds which may be characterized as follows:

Bed 1 consists of a series of eight thinly bedded, laminated and massive clays, silts, and sandy silts. A few boulders and cobbles are scattered through the fill, and potsherds were concentrated in the lowest three strata. Fewer sherds occurred in the upper strata, but it seems likely that the well continued in use by the Indians at least to this point.

Bed 2 consists of highly compacted clay, dark gray-brown in color, which floors the present basin.

An examination of the profiles of the test trenches demonstrates the method of excavation used by the Indians, and an analysis of the contour map shows the probable reason for selection of the site. The placement of the well immediately adjacent to, but not in, the stream channels would seem to indicate an attempt to tap the subsurface drainage of the streams or the alluvial fan, rather than the surface run-off which might pollute the water supply. Further, while the streams themselves are ephemeral, there is likely to be a perennial subsurface flow. Another possibility is that the Indians deepened a natural spring, cleaning out the basin to collect and store the increased flow.

The profiles show that the original excavation was made, either in a series of three concentric steps or in a spiral ramp, into the sterile alluvial clay (Fig. 63, *b*). The first suggestion seems more likely, however, inasmuch as the depth of the well would not justify cutting a spiral ramp. Furthermore, the presence of a number of boulders in the fill suggests the possibility of the construction of a stairway from the top to the lower steps.

The collecting basin itself, in contrast to that in Arizona W:10:98, was wide and shallow, being probably at least 3 m. in diameter and only about 40 cm. in depth. The entire original well was perhaps 8.50 m. in diameter and nearly 2.50 m. deep.

Following the use of the well as such, the basin continued to hold water, since all the subsequent beds within the basin are waterlaid, are thickest in the center, and lense out as the periphery is approached. At the time the Double Circle Ranch scooped out the basin to its present depth and added

TABLE 5

PROVENIENCE AND PERCENTAGES OF POTSHERDS FROM RESERVOIRS AND WALK-IN WELLS

POTTERY TYPE	SITE NO. / TEST NO. / BED	Ariz. W:10:83				Ariz. W:10:50-52-53							Ariz. W:10:98				Ariz. W:10:25		
		2	3	5	Total	1	2		3	5	6	Total	1	1		Total	1-2		Total
		2&3	1,2&3	2&3	and %	2	1	2	2&3	2	2	and %		2	3	and %	1/A	1	and %
Four-Mile Polychrome (Local)		....	2	....	2	6	2	....	....	4	....	12	....	....	....	.....	....	....	.....
		....	....	....	2.27	....	....	....	....	....	....	5.04	....	....	....	.....	....	....	.....
Four-Mile Polychrome		1	....	2	3	4	1	2	....	2	4	13	....	9	1	10	....	....	.....
		....	....	....	3.40	....	....	....	....	....	....	5.46	....	....	....	3.81	....	....	.....
Pinedale/Four-Mile Polychrome		....	....	....	.....	....	1	....	2	1	....	4	3	9	4	16	....	....	.....
		....	....	....	.....	....	....	....	....	....	....	1.68	....	....	....	6.10	....	....	.....
Pinedale Polychrome		....	....	....	.....	2	....	....	....	1	....	3	....	....	....	.....	....	....	.....
		....	....	....	.....	....	....	....	....	....	....	1.26	....	....	....	.....	....	....	.....
Kinishba Polychrome		....	....	....	.....	....	....	....	....	1	....	1	....	....	....	.....	....	....	.....
		....	....	....	.....	....	....	....	....	....	....	0.42	....	....	....	.....	....	....	.....
Gila Polychrome		....	....	....	.....	2	....	2	1	5	....	10	....	4	....	4	....	....	.....
		....	....	....	.....	....	....	....	....	....	....	4.20	....	....	....	1.52	....	....	.....
Tonto Polychrome		....	....	....	.....	....	....	....	....	....	....	.....	....	8	....	8	....	....	.....
		....	....	....	.....	....	....	....	....	....	....	.....	....	....	....	3.05	....	....	.....
Pinedale Black-on-Red		....	....	....	.....	1	....	....	....	....	2	3	....	1	1	2	....	....	.....
		....	....	....	.....	....	....	....	....	....	....	1.26	....	....	....	0.76	....	....	.....
Gila Black-on-Red		....	....	....	.....	....	....	....	....	....	....	.....	....	2	1	3	....	....	.....
		....	....	....	.....	....	....	....	....	....	....	.....	....	....	....	1.14	....	....	.....
Point of Pines Polychrome		....	....	....	.....	....	....	....	....	....	....	.....	....	....	....	.....	1	....	1
		....	....	....	.....	....	....	....	....	....	....	.....	....	....	....	.....	....	....	0.68
Tularosa Black-on-White		....	....	....	.....	....	....	....	....	....	....	.....	....	....	....	.....	3	25	28
		....	....	....	.....	....	....	....	....	....	....	.....	....	....	....	.....	....	....	19.04
Plain Brown		1	5	1	7	6	1	7	5	2	2	23	....	3	....	3	2	20	22
		....	....	....	7.95	....	....	....	....	....	....	9.66	....	....	....	1.14	....	....	14.96
Kinishba Red		7	14	6	27	19	3	12	6	17	3	60	3	148	17	168	....	....	.....
		....	....	....	30.68	....	....	....	....	....	....	25.21	....	....	....	64.12	....	....	.....
(?) Red Ware		....	....	....	.....	....	....	....	....	....	....	.....	....	....	....	.....	16	22	38
		....	....	....	.....	....	....	....	....	....	....	.....	....	....	....	.....	....	....	25.85
Neck Corrugated Red		....	....	....	.....	....	....	....	....	....	....	.....	....	....	....	.....	....	1	1
		....	....	....	.....	....	....	....	....	....	....	.....	....	....	....	.....	....	....	0.68
Tularosa Fillet Rim		....	....	....	.....	....	....	....	....	....	....	.....	....	1	....	1	2	4	6
		....	....	....	.....	....	....	....	....	....	....	.....	....	....	....	0.38	....	....	4.08
McDonald Corrugated		....	....	....	.....	....	....	....	....	....	1	1	....	1	....	1	....	13	13
		....	....	....	.....	....	....	....	....	....	....	0.42	....	....	....	0.38	....	....	8.84
Corrugated, non-indented, wide		8	5	....	13	5	1	5	2	6	4	23	2	12	....	14	....	....	.....
		....	....	....	14.77	....	....	....	....	....	....	9.66	....	....	....	5.34	....	....	.....
Corrugated, non-indented, narrow		....	....	....	.....	....	....	....	....	....	....	.....	....	....	....	.....	4	12	16
		....	....	....	.....	....	....	....	....	....	....	.....	....	....	....	.....	....	....	10.85
Corrugated, indented, wide		14	19	3	36	23	3	11	13	16	....	66	1	18	5	24	....	....	.....
		....	....	....	40.90	....	....	....	....	....	....	27.73	....	....	....	9.16	....	....	.....
Corrugated, indented, narrow		....	....	....	.....	....	....	....	....	....	....	.....	....	....	....	.....	5	14	19
		....	....	....	.....	....	....	....	....	....	....	.....	....	....	....	.....	....	....	12.92
Corrugated, patterned		....	....	....	.....	....	....	....	....	....	....	.....	3	3	....	6	....	3	3
		....	....	....	.....	....	....	....	....	....	....	.....	....	....	....	2.28	....	....	2.04
Corrugated, obliterated		....	....	....	.....	4	....	9	2	3	....	18	....	....	....	.....	....	....	.....
		....	....	....	.....	....	....	....	....	....	....	7.56	....	....	....	.....	....	....	.....
Corrugated, fish scale		....	....	....	.....	1	....	....	....	....	....	1	....	....	....	.....	....	....	.....
		....	....	....	.....	....	....	....	....	....	....	0.42	....	....	....	.....	....	....	.....
Point of pines Punctate		....	....	....	.....	....	....	....	....	....	....	.....	....	2	....	2	....	....	.....
		....	....	....	.....	....	....	....	....	....	....	.....	....	....	....	0.76	....	....	.....
TOTAL		31	45	12	88	73	12	48	31	56	16	238	12	221	29	262	33	114	147
		....	....	....	99.97	....	....	....	....	....	....	99.98	....	....	....	99.94	....	....	99.97

the dam, cienega conditions prevailed, indicating that some subsurface flow continued. At the present time the basin itself holds only runoff water, but flowing water is still available in the bottom of the original collecting basin.

The bulk of the cultural material recovered from the various sites excavated consists of potsherds as summarized in Table 5. Two complete dipping bowls were recovered from bed 2, Arizona W:10:98; one plain brown ware with smudged interior, 175 mm. in diameter and 85 mm. deep (A-6704),[1] and a somewhat crudely fashioned red ware bowl 180 mm. in diameter and 73 mm. in depth (A-6703). Aside from pottery, a few small fragments of metates, manos, and a number of building blocks were found. Some of these undoubtedly have been washed into place by natural agencies, but some probably were placed as stepping stones, while others may have been tossed into the pools by the children of the pueblos, as in all probability were many of the potsherds. Perishable material is represented by a bundle of grass laid horizontally on the lowest step of Arizona W:10:98, probably to serve as a dry stepping place, and a piece of over-two- under-two matting (A-7117) composed of thin, flat elements about one centimeter in width, serving a similar function at the brink of the original collecting basin. Both of these had been preserved by the constantly moist condition of their matrix.

In the construction of Table 5 only sherds from levels deposited during actual use of the water systems have been included. Analysis for chronology proves the walk-in well, Arizona W:10:25, to have been the earliest of the four water systems to be constructed. It was excavated during the time that Tularosa Black-on-white was in vogue. This period is tentatively called the Willow Creek phase in the local sequence (Wendorf, 1950). A single sherd of the Kayenta-like Point of Pines Polychrome was also found. Monochrome wares and wares decorated by texturing are represented by a plain brown ware, an unnamed red ware, a single sherd of neck corrugated red ware, Tularosa Fillet Rim, McDonald Corrugated (including 7 sherds of a grooved variant), patterned corrugated and narrow-coil corrugated, both indented and non-indented. While close dating is not possible from the sherd material, a tentative date based on their temporal position elsewhere, of approximately A.D. 1100 to 1200, appears reasonable for the site. Both its construction and its abandonment, as a well, are encompassed in this time span.

Arizona W:10:98 appears to have been excavated at a time when an unnamed polychrome ware, here designated (but not formally named) Pinedale/Four-Mile Polychrome, was being made.[2] No other painted sherds were recovered from bed 1, the earliest horizon, and the number found is insufficient for conclusive dating. However, the site was abandoned before production of the local variety of Four-Mile Polychrome began. Other painted wares include Gila and Tonto Polychromes, Pinedale and Gila Black-on-reds. Monochrome and textured wares include Kinishba Red, plain brown ware, Tularosa Fillet Rim, McDonald Corrugated, patterned corrugated, and broad-coil corrugated, both indented and non-indented. The most probable date for this well is *circa* A.D. 1300-1350, during the late Pinedale or early Canyon Creek phase (Haury and Hargrave, 1931; Haury, 1934).

Both of the open reservoirs appear to have been used mainly during the Point of Pines phase, since in both, the earliest culture bearing deposits contain the local variety of Four-Mile Polychrome, a diagnostic of that phase. Arizona W:10:83 contains no painted sherds other than Four-Mile Polychrome and its local variant. Arizona W:10:50-52-53 contains a number of additional types of painted sherds, of which only Gila Polychrome was found in sufficient quantity to have cultural significance. It seems probable that the few sherds of Pinedale/Four-Mile and Pinedale Polychromes, and Pinedale Black-on-red, were derived from the earlier occupation of Arizona W:10:50.

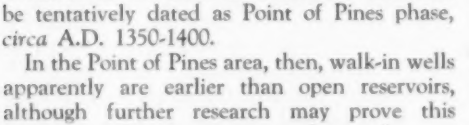
[1] Numbers in parentheses refer to Arizona State Museum catalogue numbers.

[2] This ware constitutes a definite type intermediate in decorative character and in time between Pinedale Polychrome and Four-Mile Polychrome. Interiors of this type are like those of Pinedale Polychrome while the exteriors have the full banding characteristic of Four-Mile Polychrome. It has been established stratigraphically between these two types at Arizona W:10:50. While the Pinedale/Four-Mile Polychrome designation seems cumbersome, it is thought best not to add another name to the literature until we can more firmly establish its cultural associations.

The single sherd of Kinishba Polychrome is contemporaneous with Four-Mile Polychrome. Monochrome and textured wares predominate with Kinishba Red, plain brown, broad-coil indented and non-indented corrugated common to both, and the additional presence of obliterated and fish-scale corrugated in Arizona W:10:50-52-53. Both of these sites can then be tentatively dated as Point of Pines phase, *circa* A.D. 1350-1400.

In the Point of Pines area, then, walk-in wells apparently are earlier than open reservoirs, although further research may prove this sequence to be more apparent than real.

TABLE 6



Relative percentages of pottery wares from reservoirs and walk-in wells. Black = brown ware; stippled = red ware; diagonal hatching = corrugated ware; vertical hatching = painted ware.

The raw data presented in Table 5 have been regrouped as a bar graph in Table 6. This graph indicates the relative usage of various types of pottery for obtaining and carrying water at the different sites, assuming the sherds recovered to be actually from vessels used for handling water. With the exception of Arizona W:10:50-52-53, it appears that there has been little drift material. Further, the recovery of whole vessels from Arizona W:10:98, and the relative homogeneity of sherd collections from the sites, lend credence to the assumption that the sherds are primarily from water vessels. Analysis of the variants in Table 6 shows that the relative usage of the four main groups varied from phase to phase; that corrugated and red wares were most frequently used, with the latter forming an overwhelming choice at Arizona W:10:98, while corrugated wares predominate at the other three sites, increasing in abundance from early to late. The use of brown ware declines from early to late, with Arizona W:10:98 as a notable exception because of the almost complete absence of this ware. Use of painted ware likewise decreases from early to late, particularly if the figures for Arizona W:10:50-52-53 be corrected to delete those types obviously out of context.

The question arises as to whether there was a preferred type within the range of available wares of the particular phases represented by the different sites. Within the limits of reliability of the present sample for each phase, any considerable increase in the proportion of a type from its normal percentage of that phase might be interpreted as a preference for its usage in the handling of water. In order to ascertain these relationships, percentages of sherds recovered (but not described here) were computed for midden debris for each phase represented by a water system to establish a norm for comparison. These have been arrayed in Table 7 so that norm percentages for the phase are directly comparable to those for the contemporaneous water system.

TABLE 7

	Willow Creek		Canyon Creek (early)		Point of Pines Phase		
WARE	Norm	:25	Norm	:98	Norm	:50-52-53	:83
Brown	16.1	14.9	12.6	1.1	10.7	9.7	7.9
Corrugated	62.1	39.3	70.9	18.3	59.7	46.5	55.7
Red	9.1	26.5	9.4	64.1	13.7	25.4	30.6
Painted	12.6	19.7	7.0	16.4	15.7	19.5	5.7

Comparison of norm and site occurrence of pottery wares by phase. :25 = Arizona W:10:25, :98 = Arizona W:10:98, :50-52-53 = Arizona W:10:50-52-53, :83 = Arizona W:10:83.

Analysis of Table 7 shows that red ware occurred in all water systems in much greater frequency than in the norm for the corresponding phases, pointing to the probability that red ware was generally preferred for handling water. In this connection it is interesting to note the modern parallel usage of red ware for handling water among the Papago and in the rural districts of Mexico. Painted wares seem also to have been extensively used for this purpose except in Arizona W:10:83. Brown ware and corrugated ware, on the other hand, occurred far less often than in midden deposits. However, during Point of Pines phase, when the open reservoirs were being used, there seems to have been less selection in this regard, and the use of corrugated ware more nearly approximates its norm. These data would tend to confirm the hypothesis that brown and corrugated wares were primarily

cooking and storage wares, painted and red wares being more widely used for other purposes. It would further appear that red wares were water vessels *par excellance*. This is not unexpectable inasmuch as the slipping and polishing of red ware produces a less pervious vessel, while unslipped brown ware and the highly porous corrugated wares would appear less satisfactory for carrying and storing water.

Open reservoirs similar to Arizona W:10:83 and Arizona W:10:50-52-53 are widely distributed in the Southwest and are known both archaeologically and ethnologically. I shall here indicate only a few of the occurrences. In the Rio Grande area they occur archaeologically in the Galisteo Basin (Nelson, 1914) and Gran Quivira (Toulouse, 1945). An open shallow pond holding runoff water exists at Acoma. They are used by the Hopi to hold water for irrigation of fields (Hack, 1942). Along the Gila and Salt rivers open reservoirs were used by the Hohokam in connection with canals as a part of extensive systems of irrigation (Haury, 1937). The construction techniques of open reservoirs range from the damming of small streams to rather extensive excavated basins. In general, suitable sites where adequate runoff was available were selected and converted by simple means into retaining basins. Extensive knowledge of hydrology was not necessary, although some practical ability in the construction of dams was needed. Perhaps the chief problem in relation to this kind of water supply was pollution. Under proper circumstances, however, reservoirs must have enabled the Indians to enjoy a more secure livelihood.

Water systems of the walk-in well type involve a knowledge and understanding of the movements of underground water. While these movements are not complex, it nevertheless requires a certain degree of engineering skill to develop a well or a spring so that it yields a significant quantity of usable water. That the Indians achieved this skill indicates a broader knowledge of engineering than has generally been recognized heretofore. Furthermore, it may shed some light on the ability of the Indians to inhabit areas largely depopulated today.

In connection with the selection of sites for walk-in wells it is interesting to note that the Indians located their wells so as to trap the subsurface flow of surface channels. Gregory states that "Water is, therefore, likely to be found at least depth near the main channels of a wash, and it seems desirable to select well sites on the borders of the wash above the reach of the highest floods. Chances for success are improved by the selection of a site near the junction of a tributary wash with the main channel" (Gregory, 1916, p. 163).

There is little to be found in the literature concerning this form of aboriginal water system. Isolated reports, however, demonstrate a geographic range which would seem to indicate that they are far more common than at present suspected. Gregory (1916, p. 164) reports that the present day water supply for the trading post of Wide Ruin (Kintiel) in northeastern Arizona is obtained from an aboriginal well dug into the alluvial fill of a narrow canyon. The well is square in plan, 16 feet across, walled with flat slabs of stone, and with a series of stone steps leading to the water. Hargrave (Haury and Hargrave, 1931, p. 81), who conducted archaeological excavations at the site in 1929, refers to this water source as "a masonry-walled spring." His work resulted in dendrodates in the late 1200's A.D.

A second well similar in plan, construction, and time, to the Kintiel site is reported by Danson (personal communication) at the Trichado Spring site in west-central New Mexico. Recent work by Evans and Meade at the Clovis paleo-Indian site indicates the presence of a form of well or collecting basin much earlier in time than those here considered. Comparison cannot be made between these and the later walk-in wells, but they demonstrate the early arrival of the trait.

While the writer knows of no further examples of archaeological wells in the Pueblo area, they are known ethnologically from the Hopi villages where conical walled depressions are excavated to increase the flow of natural springs (Jackson, 1947). Hack (1942, p. 10) likewise mentions the use of shallow wells in addition to springs to furnish domestic supplies of water, but does not give information as to their construction.

Outside the Pueblo area wells are known ethnologically from the California desert area among the Kamia and Cahuilla. The wells apparently varied in the method of construction, some being "funnel shaped," perhaps quite similar to Arizona W:10:25 and Arizona W:10:98, and like them, designed to collect

the subsurface flow of water. Others were trenches, shallow at one end and deep at the other. Some were apparently excavated in the beds of arroyos, and therein differed from the Arizona wells. Walker (1938) has briefly summarized this material, but the data are insufficient to directly compare these wells with those of Point of Pines.

SUMMARY

Investigation of a series of depressions associated with archaeological sites in the Point of Pines area in east-central Arizona resulted in the definition of two kinds of indigenous water systems. Broad, open reservoirs for the collection and conservation of runoff water are local manifestations of a technique widely distributed among prehistoric and historic Indians of the Southwest. The second and more complex type consists of shallow excavations of an inverted cone plan designed to tap and collect the subsurface flow of water near, but not within, stream channels. This kind of water system, here termed walk-in wells, involves knowledge of the principles of groundwater movement and a considerable degree of engineering skill. Distribution of these walk-in wells is not so well known as is that of the reservoirs, but they are found archaeologically in west-central New Mexico and in the Hopi area, and historically among the Hopi and some of the California desert tribes to the west. An early form appears at Clovis, New Mexico.

Chronologically, walk-in wells appear earlier in the Point of Pines area, the earliest dating to *circa* A.D. 1100, while the reservoirs probably cover the time span from A.D. 1350 to 1400. Cultural data were produced which suggest that specific kinds of pottery were preferred for the handling of water; these were red slipped wares and painted wares, as opposed to brown ware, corrugated, and other textured types.

It would appear that walk-in wells may be widely distributed but generally have escaped recognition by archaeologists. Since water systems of this kind might permit occupation of otherwise inhospitable areas, they should be searched for whenever other sources of water seem insufficient for the support of the aboriginal population.

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THE HURON AND LALONDE OCCUPATIONS OF ONTARIO*

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THIS WILL REPORT the results of several years' search for historical sites in Simcoe County, Province of Ontario, in the area where the historic villages of the Huron were located. In the course of this work, certain aboriginal artifacts were found to be numerous on many sites but did not occur on others. In view of the current assumption of homogeneity for Iroquoian material in this area, the presence of a multiple artifact complex presented an interesting field for archaeological activity. Evidence of two cultural horizons accumulated as more sites were visited and more material marked and segregated, until finally in the summer of 1949 artifacts of two types were found in a .ratified position on the Fallis site. Herewith I wish to give a brief description and grouping of the sites, and of their aboriginal material. Later, the work done at the Fallis site will be reported, and the material found there will be appraised in relation to artifacts from the examined sites. The evidence submitted is based solely on examination of artifacts. The village sites, including the Fallis site, have been little disturbed by the author's activities, and most of them are available to reputable investigators.

Throughout the area of north Simcoe County, and in that part known historically as Old Huronia, are numerous aboriginal village sites. Some of these sites yield artifacts accompanied by European material. The artifacts of Indian manufacture so associated can only be those of the historic Hurons, since these people were dispersed so abruptly in A.D. 1650. There seems to be no historical evidence of Iroquois occupation of Huronia after the Huron dispersion, and we have the remarks of Radison (Scull, 1885) on the desolation of the country when he passed it in 1655. The considerable amount of Indian material found by Kidd (1949) during his careful excavation

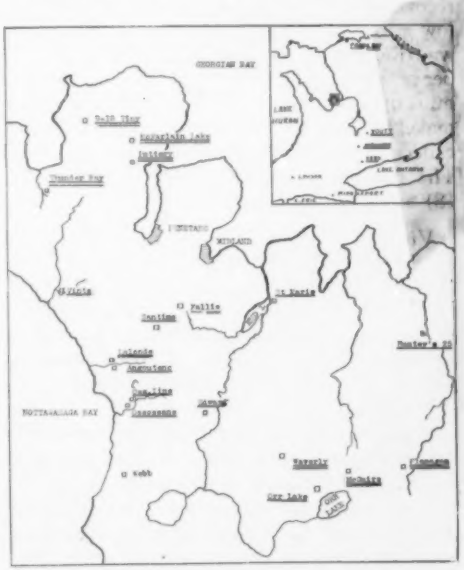

FIG. 64. Distribution of sites. Underlined sites are Huron; double underlined sites are Lalonde. Fallis site is stratified.

*The writer is indebted to K. E. Kidd of the Royal Ontario Museum of Archeology, for allowing him to examine and use material in that institution, and for a patient and enduring friendship that has influenced him toward an appreciation of aboriginal archaeology on a higher plane than that of a collector. I also wish to thank W. Todd, preparator of the Royal Ontario Museum of Archeology, for information on technique and material for restoring the illustrated vessels, and R. Harper of the same museum for help and criticism. Gordon Wright and Alfred K. Guthe of the Rochester Museum, and Charles Wray of that city, kindly showed me their collections of Iroquois artifacts, thereby contributing greatly to my knowledge of New York area types. Albert Spaulding, of the University of Michigan, showed me material from territory peripheral to the Iroquoian area. James B. Griffin, of the same university, has kindly criticised the first draft of this report and thereby aided much in its clarification. Griffin also showed me the interesting Susquehanna origin of a historic Huron pot style. To J. Smith, Douglas Bell and Steele who so kindly showed me their specimens recovered from the Neutral Area, and to D. Ouellette who led me to his sites near Thunder Bay, I extend thanks. D. M. McGuire of Elmvale, Ontario, has added much to my knowledge by the many discussions we have had on the subject of this paper. McGuire also generously allowed me to examine and take notes of his large collection of Indian artifacts. W. J. Fallis, the owner of the Fallis site, consented to my operations on his farm, and here I thank him for his courtesy. Not least was the help of my wife and daughter, who share the pleasures and ordeals (including poison ivy), that pertain to archaeology as an avocation.

of the Jesuit Fort Ste. Marie I, coincides with the material from such sites. Therefore these village remains are commonly known as contact Huron sites.

More numerous, and interspersed with the contact Huron sites, are the remains of Indian villages that possess no European material. Artifacts from the majority of these sites form a homogeneous group quite different to that of the contact Huron sites. There are also minor quantities of pre-historic aboriginal artifact types that are difficult to correlate at present.

Angoutenc site. On a sandy plain, situated on the south side of a ravine is the site I have identified as the location of the Jesuit named village of that name. On the plain are numerous ashbeds of varying depth, and a mixture of humus and ashes is spread over some 5 acres. Along the edge of the ravine is a continuous ashbed that is 3 feet thick in places. These ashes, very black with charcoal, contain rotten wood, carbonated corn, cut birchbark trimmings and white ashes of fresh or recent appearance. Since the site is under continuous cultivation a large number of broken, but identifiable, Indian artifacts are recovered. A trench was run through a shallow ashbed, but no depth variation of artifacts was discernable. A large number of axes, copper and brass kettle fragments, glass beads and miscellaneous pieces of iron, all of European make, are found. This site provides the largest collection of contact Huron material collected. The restored vessel fragments (Fig. 65, *13A, 18*) are from this site.

Vints Settlement site (Hunter, 1899), *Edwards site* (Hunter, 1899), *Hunters 25 site* (Hunter, 1902), *Santimo site* (Hunter, 1899), *Ossossane site* (Ridley, 1947). These sites were all occupied by the contact Hurons. Vints Settlement and Ossossane occupied positions well fortified by nature. Edwards, Hunters 25 and Santimo were like Angoutenc, situated in positions lacking natural fortifications. All these villages covered some 3 to 4 acres and accumulated ashbeds up to 3 feet in depth. The sites yield similar aboriginal material and similar European trade articles, in varying quantities. Hunters 25 was for some time the supposed site of the Jesuit mission of St. Ignace. The restored vessel (Fig. 65, *17A*) is from Hunters 25 site.

Lalonde site (Hunter, 1899). Directly across a ravine from the contact Huron site of Angoutenc, is the prehistoric Lalonde site. The site of some 5 acres, slopes southerly to the ravine, where the principal midden refuse was deposited. This midden or ashbed is spread along the edge of the ravine for 150 paces. The condition of the ashes in no way resembles those of Angoutenc, being a gray color easily mistaken for light clay, and containing little charcoal. Nevertheless the ashbed, and the whole area of the site, is well stocked with the heavy sherds peculiar to sites of this category. From surface collecting and the excavation of some 600 square feet of midden numerous specimens have been secured. These artifacts have contributed information on vessel shape and other traits. Although the site is but an arrowshot across the ravine from Angoutenc, not a sign of European material is to be found.

Waverly site. This site is listed by Hunter (1902) as No. 4, Township of Medonte. On very high ground, above a spring, this site of several acres is not naturally fortified. No European goods have been found by me. The small amount of Indian material recovered conforms with that from the Lalonde site.

McFarlain Lake site. Spread along a sandy ridge for about 250 paces, and of unknown width, the site overlooks a small lake of the same name. A trench, run through an ashbed, yielded only Lalonde type artifacts.

Ouellette site, Lot 9, Conn. 18, Tiny. This site is on a high plateau east of Thunder Bay, and comprises several acres. There are no natural defenses such as ravines, but a nearby swale still gives a supply of water. Material similar to the Lalonde site is plentiful.

Voutt site. The Voutt site is about 60 miles southeast of Huronia proper, in Scott Township, Ontario County. The area adjacent to the site is quite high, but the site is located within a low lying area. This depressed area is the head of a valley that leads to Uxbridge brook. No pottery is to be found on the surface of the site. When I visited the site, the owner had just finished plowing it. Blackened patches spread over several acres disclosed the position of ash deposits. I succeeded in locating an undisturbed ash level below the plowline, and from this was recovered a fair sample of the artifacts. Mr. Voutt informed me that

all the arrow points picked off the site are notched. No effigy material or European goods have been found to his knowledge. Added information on this site is in Boyle (1897-1898, pp. 6-7) and the articles mentioned have been added to the trait table. All pieces recovered or described as from this site are typical Lalonde. A good example is the High Collar rimsherd (Fig. 66, 23A).

McGuire site. This site, near Orr Lake, has been dug by Mr. McGuire, who has the material recovered in his possession. The writer's information is based solely on an inspection and listing of this material. All pieces are typical Lalonde and include a notched point.

York site. This is a small unfortifiable site in the southern area of York County, near Toronto. A number of artifacts were recovered by picking the surface after a cultivation. Every artifact in this collection is duplicated on the Lalonde site, with the exception of a side notched knife blade of stone.

Kinghorn site. Situated some 20 miles north of Toronto and one mile north of the crossroads called Kinghorn. The site is situated on the edge of a ravine, and is intersected by the highway. Most of the site is in trees and stumps. An area of about 100 square feet produced the material listed in Figure 69. This is a Lalonde manifestation.

Webb site. The Webb site (Ridley, 1947, map) is situated on a long low gravel ridge, about one quarter of a mile inland from open Nottawasaga Bay, Lake Huron. A site of Iroquoian people so close to turbulent unprotected water, is unique in this part of Ontario. Between the village and the lake are high sand dunes, which protected the inhabitants from the northwest winds. At the base of an adjacent sand dune is a small swamp which was probably the water supply. Some five inches of blackened soil and numerous ashbeds indicate an area about 250 yards long, along the ridge, by an average width of 60 yards. Excepting for a small part now in reforestation, the site has never been plowed, although some of the ashbeds have been destroyed by clandestine digging.

The writer's activities have been limited to the removal of one midden, specifically to look for signs of stratification, excavating a trench 10 feet long, and running a trench to the center of another ashbed, the gathering of material from the furrows of the reforested part, and the recovery of material rejected by others. Three vessels from the village and one from the sand dunes have been restored, in addition to many large and small fragments. European material and aboriginal artifacts of the contact Huron types are totally absent at this site. Unlike the other prehistoric sites I have described, the Indian material is not all homogeneous with the Lalonde site artifacts. The common vessel (Fig. 68, 29) at this site is a subordinate type on the Lalonde sites, and the Lalonde High Collar vessel, in its classic form, is totally missing. There is, however, a probable prototype in the rimsherd illustrated in Figure 68, 44. A few of the typical rim designs are executed in dentate stamp and push-pull incising. Body sherds showing very bold roughening, or malleating, and check stamping are to be found on the Webb site.

A remarkable similarity exists between the artifacts of the Webb site and those of the Middleport site (Wintemberg, 1948).

Correlation of the sites discussed is based primarily upon a comparison of the recovered artifacts. These artifacts, while varying individually, as handmade objects do, nevertheless have such definite characteristics that they group quite readily. To illustrate these groups, this report includes a table (Fig. 69) upon which is a column titled, Trait Reference Number. The descriptions which follow, as well as the illustrations are keyed to the trait reference number of Figure 69. The trait sequence across the trait table disregards the usual material type sequence in favor of an arrangement that illustrates to best advantage the extreme division of artifacts for the two principle village groups. Some pottery traits may, in the future, be discarded when more full restorations are made, since several decorative features could belong to a common vessel.

The trait layout is not presented as final, infallible or complete, since the material listed is an infinitesimal quantity of that still buried in this province. Also other professional excavations recently done in the same area may result in considerable modification.

FIG. 65. Contact Huron material. *1*, Projectile point; *7*, castellated, or Huron pipe; 8, acorn pipe; 9, blowing face pipe; *10*, decorated trumpet pipe; *11*, decorated pipe stem; *12*, plain pipe stem, modeled tip; *13*, *13A*, pot castellation, lip flattened; *14A*, *14B*, *14C*, Susquehanna High Collar pottery; *17*, *17A*, notched rim, pottery; *18*, typical pot fragment; *13A*, *17A*, *18*, proportional to scale (a). All others proportional to scale (b).

Trait 1. Figure 65, *1*. A small projectile point, made of chert, and averaging 4 cm. in length. Triangular with straight to concave base, and straight to convex sides. These are common on contact Huron sites.

Trait 2. Figure 66, *2*. Discoidals of stone, ceramic and reworked potsherd. Those of clay and potsherd average 3 cm. in diameter and some 5 mm. in thickness. The stone types are similar in size, but look like a polished pebble. These are found on contact Huron sites.

Trait 3. Beads, pendants, cut blanks and miscellaneous pieces of conch shell. Beads are cylindrical and discoid. Pendants range from plain rectangles to worked columnellas. Found plentifully on contact Huron sites.

Trait 4. Beads and pendants made of red catlinite; the catlinite, I presume, is an importation from the west. The pieces range from drilled rectangular and cylindrical beads to delicately carved pendants. Peculiar to contact Huron sites only.

Trait 5. Figure 66, *5*. Thin center-pierced needle, or bodkin, made of a bone splinter, pointed at both ends, 13 cm. in length.

Trait 7. Figure 65, *7*. A clay pipe of full color range that has four castellations on the rim of the bowl. Vertical indentations occur on the face of each castellation. Between these features are usually two horizontal incised lines. The stem is always curved and decorated with fluting and incising. In Huronia these pipes are very common on contact Huron sites. Elsewhere in Iroquoian territory they are designated "Huron Pipe."

Trait 8. Figure 65, *8*. A clay pipe, the bowl of which is round and cup shaped; resembling an acorn cup minus the nut. Very dark to a light buff in color, the dark predominating. The body of the bowl is completely covered with incised annular lines, under which there is, on most specimens, an annular line of closely spaced small punctates. The stems are round in section, curved, but not decorated. I find these solely upon contact Huron sites, but elsewhere in Iroquoian territory they are attributed to Seneca.

Trait 9. Figure 65, 9. All the various styles of effigy pipes peculiar to the Iroquoian area, whether composed of stone or clay. Included in the clay variety are the pinched face, the blowing face pipe that has a twisted stem, the owl pipe, crow pipe, bird pipe, fox or wolf pipe. The stone variety include the lizard pipe and those with a human effigy projecting from the bowl rim. Evidence of these is found principally on contact Huron sites, and completely absent on Lalonde sites. Duplicates are numerous in collections from the Neutral Iroquoian area and from the western Iroquois district of New York.

Trait 10. Non-effigy modelled pipes of clay or stone. The stone inventory includes the Vasiform stemless type and a simple cone shaped stemless pipe. The clay inventory includes a type similar to Figure 65, *8*, but with vertical or spiral incising on the bowl, and the contact Huron trumpet pipe Figure 65, *10*. The latter seems to be usually dark in paste and has a flared bowl up to 7 cm. in diameter. This trumpet type is carefully modelled, having the rim thickened as if to make the inside cylindrical. The bowl is decorated with vertical incising. Below the bowl where the stem curves, an encircling band is applied. The stem of this pipe is always fluted and decorated. The pipes in this category, including this trumpet type, I find on contact Huron sites. The majority of these pipes occur in the western Iroquoian territory.

Trait 11. Figure 65, *11*. Pipe stems of clay that are fluted and incised, and have a modelled and bulbous tip. They pertain to a great number of the contact Huron pipe types. Found only on sites of that type.

Trait 12. Figure 65, *12*. Undecorated pipe stems that have modelled bulbous mouthpieces. Peculiar to contact Huron sites in Huronia.

Trait 13. Figure 65, *13*, *13A*. The contact Huron Flat Top ear. A clay pot ear that appears in varying widths and height. The lip of the ear is always a rectangular plane, and often cross notched as illustrated. The incising of the vessel's rim often changes angles under this feature, so it is assumed that more than one ear of this type was on each vessel. Another ear type included in this category has one deeply incised notch across the top that extends vertically down the face of the ear in such a way as to weaken the feature. Another variety has parallel vertical incising on the ear.

FIG. 66. Prehistoric Huron artifacts and Lalonde High Collar rimsherds. *13C, 13B, 16,* Restored vessels from Fallis site, proportional to scale (a); *A, B,* non-listed pipes from Fallis site; *5, 22, 9A, 2,* Fallis site. Proportional to scale (b); *23,* restored Lalonde High Collar vessel from low level, Fallis site, proportional to scale (d). Lalonde High Collar rimsherds from various sites; *23A,* Voutt site; *23B, 23C, 23D,* Lalonde site; *23E,* York County, Smelsef-Orr collection, Royal Ontario Museum of Archeology; *23F,* Lot 9, Conn. 18. Tiny Township; *23G,* York Township, Dunn collection, Royal Ontario Museum of Archeology. *23A, 23B, 23C, 23D, 23E, 23G,* proportional to scale (c).

The sherds of sufficient size indicate a globular vessel of medium thin hard ware. At present, with meagre information relative to the immediate antecedents of the contact Huron, I group these castellations when the lip is a rectangular plane, smooth or cross notched. Castellations of this type seem to have passed through many development stages in Ontario. An analysis of the various types could be a considerable and valuable undertaking. Affinities appear in many of the aspects peripheral to the Great Lakes.

Trait 14. Figure 65, *14A, 14B, 14C*. Susquehannock High Collar (Andaste). A dark brown to black ware, averaging 6 mm. in thickness, fine grit tempered and very strong and hard. Rimsherds, or collarsherds, are from a collar of 6 cm. to 12 cm. in height. This high collar of thin ware pertains to a neckless, semiglobular vessel. In cubic capacity, the space within the body, up to the slight constriction at the base of the collar, would be approximately half the vessel's capacity.

Common to most rims is an incised line encircling the rim, about 1 cm. below a flat or rounded lip. The narrow space above the line is incised or notched vertically. A hachuring of vertical lines extends from the rim line to the base of the collar, in a position centered under the castellations. The remaining area is divided by right and left slanting groups of lines. The areas between the latter have horizontal rows of closely spaced, large punctates. Vertically elongated punctates encircle the base of the collar.

This vessel is an intrusion into the contact Huron complex from the Andaste or Susquehannock people of Pennsylvania. The vessel is well illustrated by Wren (1914), on plates 4, 8, 10, 13, 18, 20. Cadzow (1936), reports on the excavation of vessels of the type, from sites in the Safe Harbour section of the Susquehanna River. Illustrations are on plates 70, 74, 91, 124 (Cadzow, 1936). These illustrated vessels are all from late sites.

The principle variation of construction is the tempering, which in the United States is shell. For this reason it can be assumed the vessel idea intruded, and they were not made by visitors or captives. Contemporary history indicates an alliance between the Huron and Andaste nations, a situation that would tolerate foreign design.

In Cadzow (1936), Griffin states that the affinities of the Susquehannock High Collar vessel are with the area to the north. Since the area to the north is New York, and considering the affinity of the Mohawk-Onondaga collar to Lalonde High Collar in Ontario, a basis for postulating a ceramic connection exists. Features of the Lalonde High Collar (see trait 23) rim found on Susquehannock High Collar are: vertical hachuring below the castellations, one or several horizontal lines below the lip, the large area marked into triangular areas. Missing features are: horizontal lines at the base of the collar, the long neck and thick friable ware. The additional features found on Susquehannock High Collars are the notching at the lip and the horizontal rows of punctates in the plats. The lip notching, short neck and thin, hard, ware, are common in the late continental pottery evolvement. The broad punctate plat filling could be a re-arrangement of the Lalonde, Eastern Iroquois habit of outlining plats with punctates.

Trait 16. Figure 66, *16*. Pottery shoulder castellation. A pointed shoulder castellation placed upon the shoulder of a small vessel, directly under a Huron Flat Top rim ear. There is always evidence of ornamentation below the shoulder of the parent vessel. The arrangement of ornament and features suggests an abandoned attempt at constructing a handle. Since one example has been found on a contact site, and the presence of the Huron ear, the type may be regarded as late Huron. The writer found one of these shoulder points on a Victoria County site, and one in the upper levels of the Fallis site. Wintemberg (1936) illustrates one specimen.

Figure 65, *17, 17A*. Pottery rimsherds with a flattened overhanging lip that is pinched or notched. Also in the group are rimsherds that are notched on the thickened base of a shallow collar. Some of the latter have pinching to the extent of forming a projecting node. The ware is dark color, thin and hard. The complete vessel is globular and probably averages 20 cm. in over-all width.

In central Ontario I find these types occurring sparsely on contact Huron sites only. I have seen the notched overhanging lip type in the museum of the University of Florida and the University of Tennessee. Both types

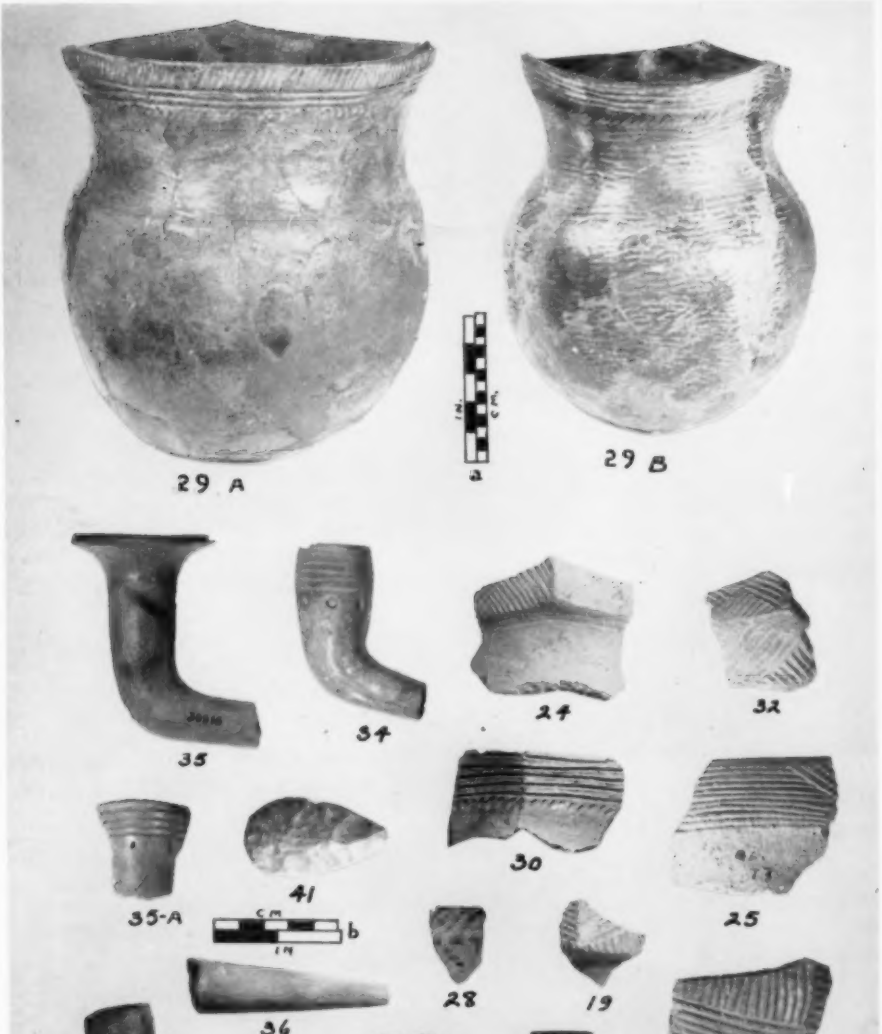

FIG. 67. Material of the prehistoric Lalonde focus. *29A, 29B,* restored vessels of Webb Common style, Webb site; *19,* pointed pot castellation, angular rimmed vessel; Lalonde site; *24,* pointed pot castellation, Webb site; *25,* interrupted horizontal line rimsherd, York site; *26,* rolled rim, Webb site; *27,* punctate over line on collar, Lalonde site; *28,* oblique collar incising, punctate below, Lalonde site; *30,* annularly incised collar, Webb site; *32,* neck decorated pottery, low level, Fallis site; *34,* typical barrel pipe, York County, Royal Ontario Museum of Archeology; *35,* typical trumpet pipe, Lalonde site; *35A,* variation of trumpet pipe, Webb site; *36,* typical tapered pipe stem, Lalonde site; *20,* scalloped rim, Webb site; *41,* plano-convex scraper, Lalonde site; *E,* rectangular pipe, low level of Fallis site. All objects proportional to scale (b).

appear in several components of the Ft. Ancient aspect (Griffin, 1943) and in an extreme form this is a dominant vessel on Seneca sites.

Trait 18. Figure 65, *18*. Miscellaneous basic rimsherds. These sherds have a slightly thickened collar of an average depth of 18 mm., upon which are vertical and oblique incising, chevrons and crosshatch incising. The ware has a full range of color, of medium to thin in thickness and quite hard. The rimsherds could be from vessels that have other features on the rim; such as the castellations described in traits 13, 16. In listing frequencies I have tried to avoid counting duplicates from a common vessel. A large number of these simple rimsherds are found in contact Huron sites, and grouped they are of some trait value.

Trait 19, Figure 67, *19*. An extremely projecting pot castellation that may originate on an oval or square mouthed vessel. All are pointed excepting one from Vints Settlement, which has an indication of handle attachment on the under surface. The writer has little information on these pieces at present, so they are grouped arbitrarily.

Trait 20. Figure 67, *20*. A rimsherd carrying a thickened collar. The lip of which is multicastellated by thumb rolling. The collar averages 2 cm. in depth and is incised sometimes horizontally and on some vertically. The ware is always soft and light colored. The evidence leans toward a Lalonde origin for the type, since those from contact Huron sites were recovered from the surface, in contrast to the larger number excavated from undisturbed Lalonde deposits.

Trait 21. Figure 65, *21*. Winged drill, made of chert.

Trait 22. Figure 66, *22*. Cylindrical beads manufactured from bones of large birds. As indicated by the trait table, I find very few of these on contact Huron sites. This is probably due to the quantity of European beads traded to those people. The Lalonde sites have many of these.

Trait 23. Figure 66, *23*, *23A*, *23B*, *23C*, *23D*, *23E*, *23F*, *23G*. High Collar Lalonde pottery. Ware is medium grit tempered, medium hard, well smoothed and brown to light brown in color. Vessels are at least 30 cm. in height and have an elongated appearance. The slightly concave faced collar of 8 cm. or more in depth, carries two weak castellations that are placed opposite each other. The neck is constricted and long; about twice the depth of the collar. At the base of the neck, or at the shoulder, the diameter of the vessel is greater than at the collar. The body of the vessel suggests a semi-circle in vertical section.

The following is the typical applied decoration of the classic of this variety: A hachuring of vertical incised lines is placed below the castellation. Two or three incised horizontal lines closely spaced on the lower edge of the collar, sometimes on the upper edge of the collar and sometimes both, connect or stop at the vertical hachuring. The space above, below or between these is filled with open triangular areas that are circumscribed with punctates, while other triangular spaces may be hachured with oblique or horizontal lines.

The examples illustrated are to demonstrate how the adherence to decorating technique obtained over a considerable geographical area. The restored vessel, Figure 66, *23*, is a poor representative of the type. The decoration, while true in detail, is executed in an amateurish way; quite the reverse of the bold incising that is typical. The proportions of this vessel are not the average, for it should have a more elongated appearance. Nevertheless the exact detail on the collar places this vessel very definitely in the type.

As the name implies, this pottery is found on Lalonde sites only. Illustration, Figure 68, *44*, of a sherd from the Webb site is an extreme example of trait 30 that may be a prototype of the High Collar Lalonde. In the report of the Middleport work tentative forms of High Collar are illustrated (Wintemberg, 1948, Pl. 6, 2, 13, and Pl. 12, 70, 71, 72, 73, 79).

The collar design on some Mohawk Valley pottery matches certain classic High Collar Lalonde rimsherds in every detail. The former differ in ware, being thinner and from short necked globular vessels. An affinity also exists with a high collar vessel of the Susquehannocks or Andastes (see trait 14 of this report).

The writer is at present inclined to consider this pot style to be the ancestor of the later Mohawk, Onondaga and Susquehannock collared vessel.

Trait 24. Figure 67, *24*; Figure 68, *32*. Pointed pot castellation, of light brown color and medium thickness. Simple oblique incising that changes angle on the castellation is the

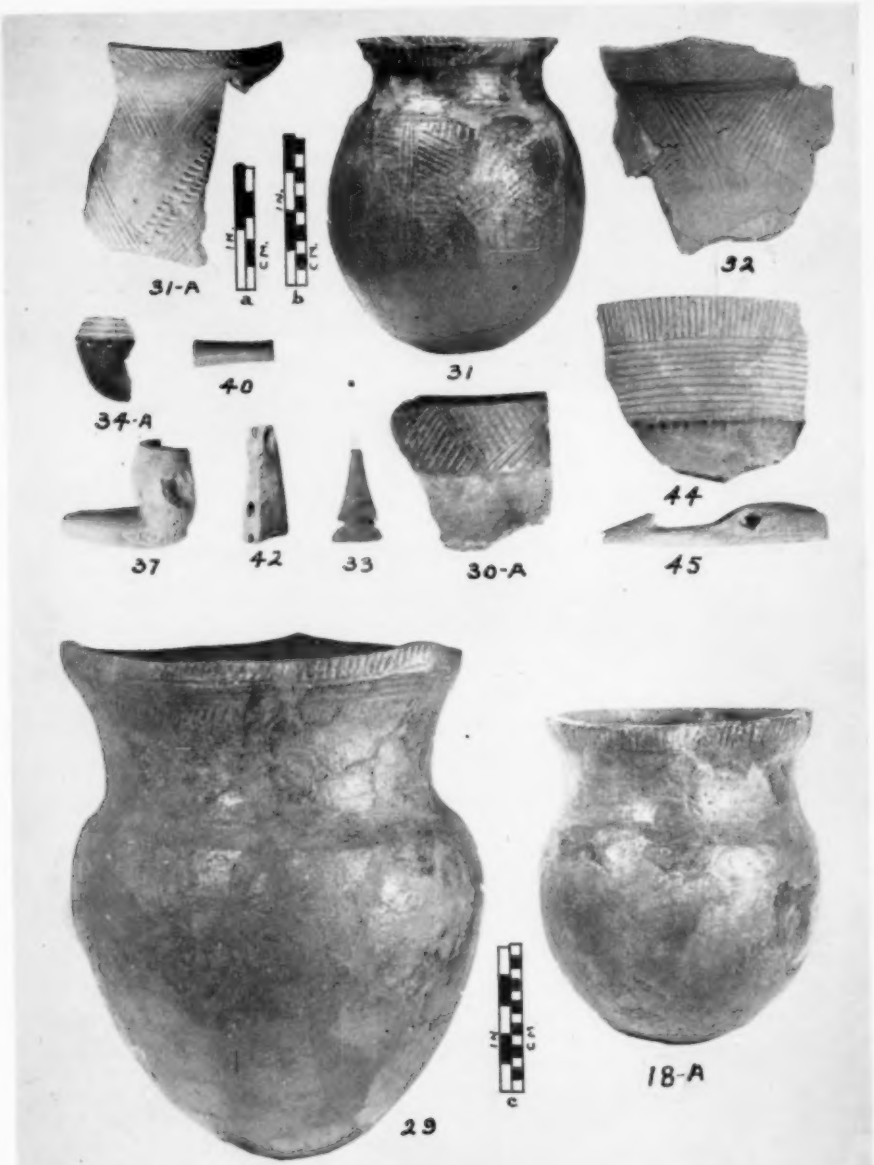

FIG. 68. Material from the prehistoric Webb site. *29*, restored vessel, Webb Common type; *30A*, decorative variation of trait 30; *31*, *31A*, body decorated vessels; *32*, neck decorated pottery; *33*, Lalonde type projectile point; *34A*, variation of barrel pipe; *37*, pipe fragment; *40*, flared tip pipestem; *42*, worked deer phalange; *44*, variation of Lalonde High Collar rim; *45*, bone harpoon point; *18A*, restored vessel, simple incising. *31*, proportional to scale (b); *29*, *18A*, proportional to scale (c). All others proportional to scale (a).

usual decoration. The "point" specification very successfully separates this castellation from the Huron Flat Top castellation. These occur only on sites of the Lalonde group and the Webb site.

Trait 25. Figure 67, *25*. A pottery rimsherd from a flared mouth, elongated neck vessel. Ware is a medium hard light brown to red brown in color, with medium grit tempering. Average thickness is 7 mm. excepting a thickening that forms the base of a collar. Decoration is on the collar only, and consists of closely spaced horizontal incising, which is interrupted by either oblique or vertical incising. The decoration style is the basis of this trait. Peculiar to Webb site and the Lalonde sites.

Trait 26. Figure 67, *26*. Pottery sherds from a flared mouth vessel, the rim of which is rounded inwardly. Ware is usually light brown color medium hard, medium grit tempered and probably 8 mm. in average thickness. This is in fact a rim section subdivision, that appears incidental to Webb Common vessels, and rimsherds of simple oblique line incising.

Trait 27. Figure 67, *27*. Rimsherds possessing an apparently uninterrupted horizontal incised line underlying other incised lines of various designs, the whole being upon the collar. The collar is very narrow to not more than 25 mm. in depth. Ware color range is light brown to buff, fine to medium grit tempered, and medium to heavy in average vessel thickness. Nevertheless rim sherds from small vessels may be quite thin, but they are always light in color. Peculiar to Webb site and Lalonde sites.

Trait 28. Figures 67, *28*. Pottery rimsherds of predominately light brown color that escape the classification of trait 18 (simple oblique incising) by virtue of a row of punctates immediately below the simple incising. These are common on the Lalonde site.

Trait 29. Figure 67, *29A*; Figure 68, *29*. Webb Common vessel. Rims possessing uninterrupted horizontal incising that underlies vertical or oblique incising on the narrow collar. Ware is light brown to buff, coarse grit tempered, and thick when it appears on the Webb site. The design layout is more delicately executed, on a harder and thinner ware, that is red brown in color, when it is found on Lalonde sites. Vessels restored from the Webb site have a flared mouth and a neck length one third of the vessel's height. The collars are thin lipped and no more than 15 mm. in depth. Three pointed castellations are typical.

Variations of this rim design are found on Lalonde sites, the Lawson, Uren, and Middleport publications (Wintemberg, 1939, 1928, 1948), and collections in the historic Neutrals area. A perfect representative of a Webb vessel of the type is illustrated on Plate X of the Middleport publication.

Trait 30. Figure 67, *30*; Figure 68, *30A*, *44*. Rimsherds belonging to vessels which have slightly flared collars. Collars are not much thicker than the body ware and average 3 cm. in depth. Ware is buff to dark brown in color, fine to coarse in both grit tempering and paste. Decoration is limited to the collar, and consists of unbroken annular incising or hachured incising. Occasionally there is a row of punctates immediately below the collar. Type is peculiar to the Webb site and the Lalonde group of sites.

Trait 31. Figure 66, *16*, *13C*; Figure 68, *31*, *31A*. Body decorated sherds appear upon Webb, Lalonde group and contact Huron sites. A common feature is evidence of carination throughout the range of varieties. The Webb type is a thin ware that is black to dark brown in color, and very hard. Sherds are fine grit tempered, and the paste in every way resembles the best contact Huron pottery. A complete vessel is small, averaging no more than 18 cm. in body diameter. The rim is shallow and flaring, the neck is constricted and short, whereas the body is elongated. When carinated, that feature is low on the body.

Decoration consists of simple incising and notching on the lip and rim. Usually an annular line is trailed at the shoulder, and below this, extending well down the body, are hachured plats and chevrons in a variety of designs. Several body sherds have examples of a double row of open chevrons, through which run oblique lines of punctates. In decoration layout there is an affinity with certain Castle Creek vessels (Ritchie, 1944) excepting the latter is executed in corded stamp. The open chevron applied to the body in one or double rows is on vessels from Manitoulin Island, Lake Abittibi and the lower St.

ARTIFACT TRAITS OF POST WOODLANDS ABORIGINAL GROUPS IN SOUTHERN ONTARIO.

LAWSON= publication
MIDDLEPORT= publication
M = many
P = present

| | Trait reference No. | HURON COMPONENTS | | | | | | LALONDE COMPONENTS | | | | | |

Lawrence River valley. The decoration also appears on vessels illustrated from the Middleport site.

The Webb body decorated vessel seems a misfit associated with the coarse soft ware typical of that site. However, careful trenching found the sherds mixed stratigraphically with the other types on that site. Both ware and design is probably a forerunner of an incoming Mississippi pottery technique.

The Lalonde variety is a soft light colored ware, grit tempered and from 6 mm. to 13 mm. in thickness. The vessels vary greatly in size but all carry incised body designs similar to Webb type (Fig. 68, *31*) and are carinated. The body of the vessel is wider than the Webb.

The contact Huron type (Fig. 66, *16*) is the usual hard thin and dark to brown ware peculiar to these people. The body design is simple, being a row of punctates and an annular incised line on the shoulder, below which is a row of hachured triangles. Some of the contact Huron decorated body sherds show evidence of carination.

Trait 32. Figure 67, *32*; Figure 68, *32*. Neck decorated pottery. A brown colored, fine grit tempered ware from a flared mouth vessel of medium size. The lip is narrow. The collar of about 2 cm. in depth moderately overhangs the neck, thereby creating a triangular section. Angular pointed castellations appear, but otherwise the vessel shape is unknown. Decoration consists of oblique incising on the rim and the same in reverse rows down the neck in a herringbone pattern. Another treatment is all-over incised hachured triangles down the neck to the shoulder. The neck decorated sherds are peculiar to the Webb site and the Lalonde group of sites.

Trait 33. Figure 68, *33*. Projectile point of chert that in size approximates the contact Huron point. Unlike the Huron, it is side notched and slightly concave along the sides. Found on the Webb site and Lalonde sites.

Trait 34. Figure 67, *34*; Figure 68, *34A*. Barrel pipe. The paste is fine sand tempered and always light in color. The bowls are cylindrical, barrel shaped, and the odd specimen angles inward at the lip. They have one to eight lines incised annularly at the upper end of the bowl. Below this may be four to numerous punctates in a single encirclement. The incising varies from fine to broad. The finely tapered stems are attached to the bowl at or close to a right angle. This pipe seems to be the property of the Lalonde people.

Trait 35. Figure 67, *35*. The Lalonde trumpet pipe. This pipe is of fine tempered, light colored ware that is usually slipped to a beautiful orange or buff polish. The bowl appears as if made by spreading the mouth of a plain barrel pipe funnelwise, and thereby thinning the lip. Stems leave the bowl at nearly a right angle and are tapered to a small tip. No decoration appears on this pipe. On the Webb site is found this pipe with a bulbous body in addition to the typical. This is the principal pipe found on the Lalonde sites. Exact duplicates, even to paste and color, are plentiful in collections from the Mohawk, Onondaga area.

Trait 35A. Figure 67, *35A*. Incised trumpet pipe. On the Webb site are found trumpet pipes of the same ware specification as the Lalonde trumpet pipe, with the addition of incised rings above punctates, and the same with an encircling row of hachured triangles. These types are exactly illustrated from Middleport.

Trait 36. Figure 67, *36*. Lalonde pipe stem. As are the Lalonde barrel, and the Lalonde trumpet pipes, to which they belong, the stems are light in color. The stem is medium to long in length, and evenly tapered to a small tip.

Trait 37. Figure 68, *37*. A plain globular pipe bowl made of a light colored soft ware. This pipe also occurs with a decoration of tiny, irregularly spaced punctates upon the bowl. Types occur sparingly on the Webb site only.

Trait 38. A short to medium length rapidly tapering pipe stem of light colored soft ware. Probably belongs to trait 37 pipe.

Trait 39. Awls made from bones of birds and mammals. Peculiar to Webb and Lalonde sites is a deeply grooved variety.

Trait 40. Figure 68, *40*. Pipe stem with a flared tip. Material is fine tempered, dark in color and polished. This stem has the appearance of expert manufacture, as the flare at the tip is cut off in a perfect manner perpendicular to its axis. The bowl to which these belong is unknown to me. Found on the Webb site and in collections of the Royal Ontario

Museum of Archeology. Twenty-seven pipe stems of this type are recorded from Middleport.

Trait 41. Figure 67, *41*. Plano-convex and concave convex leaf shaped scrapers of chert. Flaked on one side only and averaging 4 cm. in length. Found only on the Lalonde site.

Trait 42. Figure 68, *42*. Rubbed and drilled phalange bones of deer. Found on the Webb site.

Trait 43. Projectile point of bone or antler. Present on the Webb site.

Trait 45. Plano-convex stem, polished bit, rough polled adze of basalt. These are found on the Lalonde group and Webb sites. Their scarcity on contact Huron sites may be due to the large number of iron axes imported.

On Figure 69 are two pottery decoration traits that are common to both groups. These are traits 18 and 31. Trait 18 could be subdivided into coarse and fine ware; the fine would be Huron and the coarse, Lalonde. The variation within trait 31 is dealt with in the description of that trait.

In shape, the contact Huron vessel is short necked and globular, whereas the Lalonde vessel is medium long, to long necked with rounded base. The contact Huron pot is decorated with short line incising, whereas the Lalonde types are notable for the long horizontal trailed line technique. As the trait table demonstrates, we have in Ontario a very distinct, separate, prehistoric Iroquoian complex in the Lalonde group of sites. The Lalonde people, whose burial and house traits are as yet unknown, occupied typical Iroquoian inland positions, well removed from navigable water.

How much earlier than the Hurons were to these Lalonde people is partly demonstrated by the varieties of artifacts, the condition of the earth in their respective middens, and by the excavation of the Fallis stratified site.

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THE ATRISCO SITES: COCHISE MANIFESTATIONS IN THE MIDDLE RIO GRANDE VALLEY

JOHN MARTIN CAMPBELL AND FLORENCE HAWLEY ELLIS

SINCE THE EXCAVATION of Bat Cave and the location of Cochise implements *in situ* along the banks of Wet Leggett Wash in western New Mexico, it has seemed likely that one or more of the Cochise periods might be represented in the Middle Rio Grande area where living conditions would have appeared very attractive to hunters and gatherers. In 1949 Bruce T. Ellis collected a series of artifacts, spalls, and cores in and along the surface of a wash in the Atrisco Grant, lying some 3 to 5 miles west of the city of Albuquerque. Most of the 72 possible implements were of such irregular and haphazard design that both Ellis and E. B. Sayles (who examined a representative group of specimens) felt that their identification as objects of human manufacture was open to considerable question. But the remaining group of pressure flaked blades and scrapers, the single point, a slab metate of volcanic scoria with slightly concave surface, and a number of one-handed grinding stones led to hope that further search might locate such materials in position, with the small manos, especially, suggesting Cochise affiliations.

During 1950 John Martin Campbell continued the study. Numerous sites on the Atrisco Grant were located and mapped, the survey was extended, and over one thousand artifacts were collected.

The area examined during the study lies below and east of the mesa due west of Albuquerque, New Mexico, at an elevation of slightly more than 5,000 feet above sea level. Topographically the area is characterized by a series of short, parallel, east-and-west ridges, separated by dry arroyos. These ridges terminate to the west at a distance of 5 miles from the Rio Grande River in a higher north-and-south ridge which marks the westernmost limits of the Rio Grande valley in the vicinity of Albuquerque. From this elevation the paral-

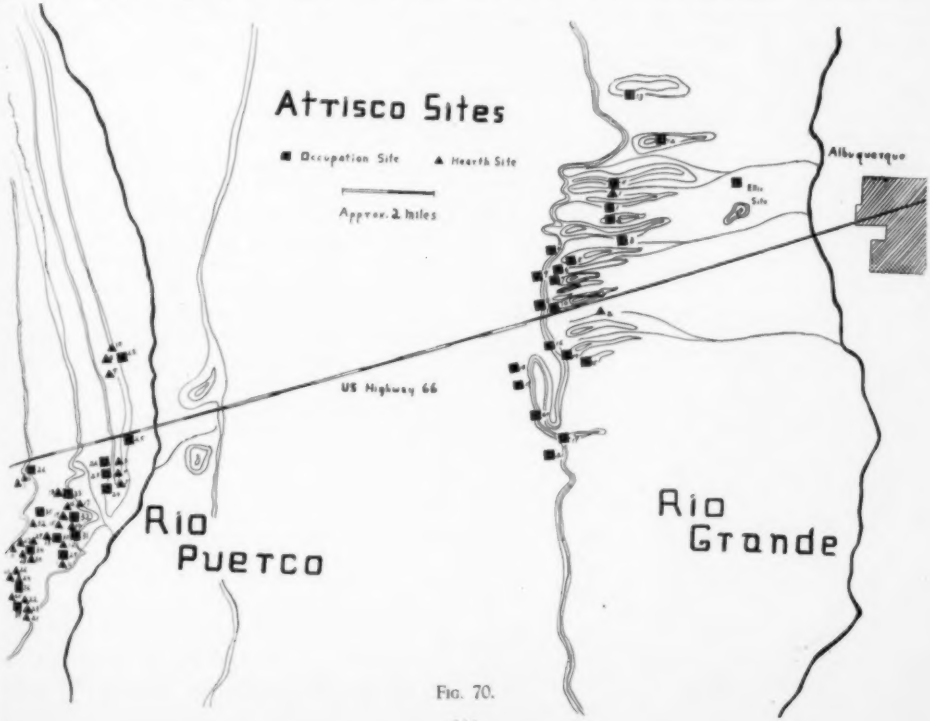

FIG. 70.

lel ridges slope downward to the east, and are dispersed in an alluvial plain bordering the river. The longest of these ridges measures 2 miles.

All of the area surveyed is extremely eroded. A number of the arroyos lying between the parallel ridges have been cut to a depth of from 10 to 20 feet below the level of the surrounding terrain. These arroyos were formed by surface water flowing from the sides of adjacent ridges during periods of precipitation. Evidence of the removal and deposition of large amounts of soil and rock is present in the form of numerous alluvial fans. A public dumping ground in the area had been covered with water-borne material to a depth of 60 cm.; this indicates that surface water has been a prime factor in the redistribution of considerable amounts of soil and rock in the alluvial plain area during relatively short periods.

The ridge crests are characterized by typical depressions and small dunes caused by wind erosion. Surface water does not accumulate along the ridge crests in large enough quantities to cause significant redistribution of rock fragments or of sand.

The soil throughout the area is largely a sandy loam.[1] Lenses of clay were observed along the higher portions of some ridges. Small fragments of quartzite and petrified wood as well as waterworn pebbles are common in some places; a volcanic cap, evidently originating from five volcanic cones 3 miles northwest extends onto the site area. Igneous rock in the form of boulders weighing from one to several pounds occasionally was observed along the ridges.

Nowhere is there a sod over the soil surface. Several varieties of cactus, as well as sagebrush and an occasional juniper constitute the most typical plant forms.

Field work was first conducted over an area measuring roughly 7 miles in length by 4 miles in width with the long axis north and south. A total of 16 ridges was examined within the Atrisco Grant as well as the rim or summit of the higher ridge lying directly to the west. Seventeen surface sites and 2 hearths in arroyo banks were mapped in the original area (see Fig. 70). Fifteen of the sites contained concentrations of artifacts in sufficient quantities to indicate that they represented areas of occupation used for periods of several months or longer. Later field work was continued east and west in an attempt to define the limits of evidence. At present these limits have not been encountered, although 30 surface hearths and 20 additional sites have been discovered outside the area originally surveyed by Ellis. (Extension of the survey for some distance westward during late 1951 has not yet located the western limits of site concentration.) All occupation areas and hearths, except for the original Ellis site, were numbered on the field map in order of discovery.

With the exception of the Ellis site, which stretched along the bank of an arroyo upon the alluvial plain and showed no definite concentrations of implements, all of the areas of occupation in the Atrisco district were located on eastern or southern slopes directly upon or slightly below ridge crests. Crest and slope sites alike were found in blowouts caused by wind action and little disturbed by surface water. These depressions ranged from one-half meter to one and one-half meters in depth. Evidently the wind depressions had effectively retained precipitation and had prevented surface water from draining to lower levels.

The ridge sites, varying from 50 to 300 square meters in area, are characterized by the presence of large numbers of artifacts lying upon a smooth wind-swept surface. Some specimens were found imbedded in the floors of the depressions, indicating that they had recently been exposed. A total absence of stratigraphy in the sides of the wind-eroded areas shows that the artifact-bearing level is just beginning to be uncovered. Occasionally a potsherd, dating anywhere from Basketmaker III to Pueblo IV was found in the blowouts, indicating that as erosion proceeded objects lying above occupation sites had moved to lower levels. Sherds likewise were present, although equally rare, upon the less eroded land surfaces showing no evidence of sites of any sort. Besides being relatively close to areas of Pueblo occupancy, this district is known as an old Pueblo trade route. It probably was frequented, also, in rabbit hunts, as it is today. Scarcity of metates may be partially explained by the modern Pueblo habit of carrying home for personal use any they chance to find.

[1] Hutchings, T. B., U. S. Soil Conservation Service, N. M. State Office, Albuquerque, N. M. Personal Communication, January 2, 1951.

Most of the sites included several blowouts and were partially buried by the intervening dunes. Archaeological material found in these depressions occasionally occurred in concentrations of 50 or more individual pieces to the square meter, the majority being spalls measuring from 10 to 30 mm. in length.

As the area of examination was extended westward from the Atrisco Grant, numerous additional sites of the same stonework complex were located. These too were in wind-blown areas and differed from the Atrisco sites only in their greater concentration. The extension of the site area continued to the ridges and gently rolling terrain bordering the Rio Puerco, an intermittent stream lying 15 miles due west. In one area of approximately 4 square miles several hundred individual blowout sites were discovered. The terrain here is generally rolling, and at the present time is covered with juniper. The number of sites and their proximity to each other gave the impression that the whole of the area had been occupied and that portions of the old cultural layer were being exposed by wind action. Dune formation has taken place to a great extent. The percentage counts of the various artifacts found in the Puerco sites remained the same as those from Atrisco, with the exception of a slight increase in the number of manos in relation to other implements. Many potsherds were found scattered over the Puerco sites but this was not surprising in view of the fact that several Pueblo ruins lie in the vicinity of these later finds.

THE HEARTHS

Of the total number of hearths discovered during the field study, 2 were located in arroyo banks and the rest occurred on or near the surface in the blown-out occupation sites.

Hearths 1 and 2 were situated in the banks of dry arroyos which ran east-and-west between the parallel ridges in the original site area (see Fig. 70). Hearth 1 (Fig. 73) was exposed one meter below the surface in the north bank of an arroyo which lay between sites 1 and 11. The sides of this arroyo were characterized by lenses of sand and gravel which had been sorted by water action. The hearth was located in a gravel lens, and consisted of 33 waterworn rocks ranging from 7 to 15 cm. in length. Numerous fire-broken rock fragments also were present. The hearth stones were arranged in a rough circle, measuring 78 cm. in diameter on an east-west axis, and 65 cm. in diameter on a north-south axis. The vertical thickness of the hearth measured 8 cm. A 3 cm. layer of charcoal was present beneath the hearth stones. Fragments of this charcoal were identified as juniper. Excavation was carried 2 m. into the bank for the purpose of thoroughly examining the gravel lens in the immediate vicinity of the hearth, and all of the excavated material was sifted through a ¼-inch mesh. The only artifact found was a quartzite blade one meter east of the hearth, and on the same horizontal level.

Hearth 2 was situated 60 cm. below the surface in an arroyo which lay slightly to the south of U. S. Highway 66. This hearth was left intact for later study.

All of the hearths found in the Puerco area were located on or near the surface in blowouts, in association with occupation sites. In a few instances the charcoal lens comprising the hearths extended over a large area, the largest (hearth 3) measuring slightly over 5 m. long and 4 m. wide.

The blowout hearths of the Puerco were characterized by a relative absence of hearth stones. In the majority of cases the hearth consisted of a charcoal lens with fewer than 6 hearth stones or fire-broken rocks. The hearth stones themselves were usually ovoid waterworn pebbles ranging in length from 10 to 20 cm. Most of the hearths produced 2 or 3 specimens of fire-broken rock. No charred limbs or twigs were encountered in any of the Puerco hearths. The charcoal was of a fine flour-like consistency and mixed with sand.

Few occupation sites in the Puerco area did not yield at least one blowout hearth. In most cases the exact location of the lenses was indicated by a discoloration of surface sand, below which the hearth extended downward to a maximum depth of 13 cm. In several instances the charcoal had been entirely swept away by wind action leaving only the few grouped stones on the present surface as evidence of what had existed.

No chipped or ground artifacts were found within the charcoal lenses, although several were collected from the upper exposed surfaces of the hearths. All but 2 of the hearths occurred in wind-blown occupation areas

which yielded numerous artifacts, but the exact original horizontal position of many of the implements collected remained a problem. As wind erosion is at present cutting through the cultural layer, it is possible that charcoal indicating other higher hearths may have been blown away, leaving the associated artifacts lying on the present and lower surface.

One unusual hearth, no. 6, discovered in a large site of occupation and the only one of the type found during the field study, should be described in some detail. This consisted of a number of flat sandstone slabs which had been imbedded in the soil to form a basin with sloping sides 17 cm. deep and 67 by 52 cm. in diameter (See Table 8). The bottom of this basin was cobbled with flat waterworn stones ranging from 10 to 15 cm. in length. Several round waterworn rocks rested upon the bottom layer, and over these were 20 smaller fire-broken fragments and a few flat bits of sandstone. This layer gave the appearance of a cover or lid to the hearth.

For purposes of comparison, 5 representative hearths are summarized in Table 8.

TABLE 8

Hearth 1

Location: One meter below surface, side of arroyo (see Fig. 70).

Dimensions: Diameter: 78 cm. east-west axis; 65 cm. north-south axis. Vertical thickness: 8 cm.

Remark: 33 waterworn rocks ranging from 7 to 15 cm. in length as hearth stones. 3 cm. layer of charcoal beneath hearth stones; fragments identified as juniper. Quartzite blade found one meter east on hearth level. (Fig. 73)

Hearth 3

Location: Surface in blowout (see Fig. 70).

Dimensions: Diameter: 5.5 meters east-west axis; 4 meters north-south axis. Vertical thickness: 15 cm.

Remarks: Numerous fire-broken rock fragments and spalls mixed with 15 cm. layer of charcoal. Two drills, one projectile point found on surface within 4 meter radius of hearth.

Hearth 4

Location: Surface in blowout (see Fig. 70).

Dimensions: Diameter: 49 cm. east-west axis; 65 cm. north-south axis. Vertical thickness: 8 cm.

Remarks: No hearth stones. Hearth consisted of lens of fine charcoal. A few spalls within 4 meter radius on surface.

FIG. 71. Blades and points. Bottom row: Clear Fork Type I points from Atrisco; middle row: Atrisco type points; top row: Atrisco blades. Length of *a*: 5.7 cm.

Hearth 5

Location: Surface in blowout (see Fig. 70).

Dimensions: Diameter: 83 cm. east-west axis; 72 cm. north-south axis. Vertical thickness: 10 cm.

Remarks: No hearth stones. Hearth consisted of lens of fine charcoal. A few spalls within 8 meter radius.

Hearth 6

Location: Surface in blowout (see Fig. 70).

Dimensions: Diameter: 67 cm. east-west axis; 62 cm. north-south axis. Vertical thickness: 17 cm.

Remarks: Basin of sandstone slabs, in which were several large sandstone pebbles and fine charcoal. Covered with small slabs and bits of fire-broken rock. Hearth located in occupation site from which were collected a number of artifacts.

CLASSIFICATION OF THE ARTIFACTS

Warned by the current confusion arising from the indiscriminate usage of various terms in describing differences among artifacts, the problem of classification was approached with caution. Krieger (1944) probably presented the most valid discussion concerning the problem with his advocation of a step by step procedure which allowed the functional use of each type or class of artifact to be clearly understood. Sayles and Antevs (1941, p. 57) have aptly stated the purpose of a classification system:

> The analysis of archaeological material is readily accomplished only when it can be classified. The adoption of some classification system will also aid the writer in better making known the types with which he is dealing.
>
> The types described herein have been determined from the "peaks," to be found in any series as subject to variations as are stone objects. Large numbers of specimens have established the validity of distinctive characteristics which distinguish the various types.
>
> In all the terms applied, the most common usage has been followed in so far as it is adequate. Both functional and descriptive terms will therefore be found, but in following a precedent long established, it is believed the reader will more readily recognize the types dealt with.

In dealing with the majority of the Atrisco flaked artifacts other than projectile points, the difficulty of exactly differentiating specimens by form or function was notably apparent. For this reason it was necessary to establish a ty-

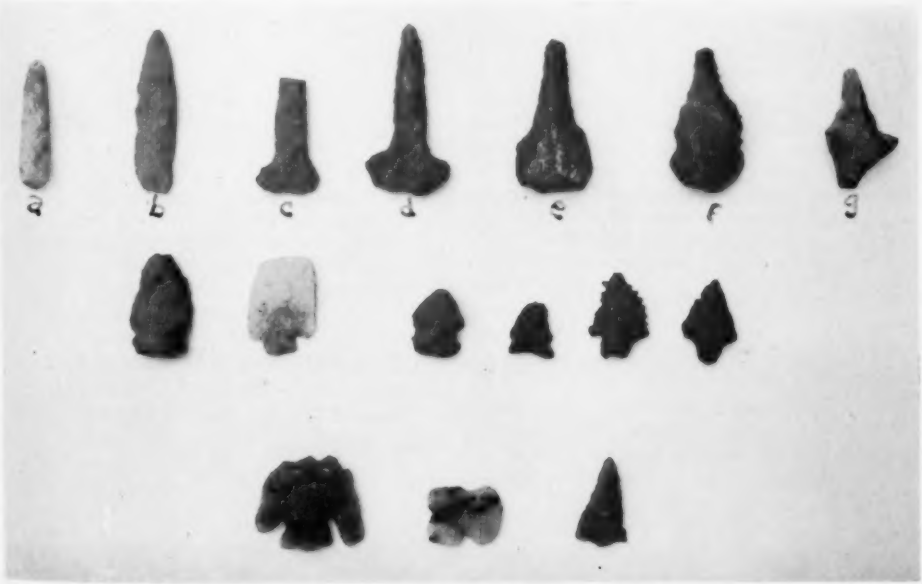

FIG. 72. Bottom row: Unclassified point; scarifier (?); unclassified point; middle row: San Jose type point second from right; others unclassified; top row: *a* and *b*, spike drills, *c* and *d*, spatulate drills; *e*, *f*, and *g*, reamers or borers. Length of *a*: 4.0 cm.

pology based upon a number of criteria, presumed function giving definition to broad general categories and sub-classes being determined by shape, proportions and parts receiving most attention from the original maker. Because of the impossibility of ascertaining the intended functional use of each artifact, arbitrary descriptive terms were employed in some cases.

TABLE 9. ARTIFACT TYPES

Projectile Points: Made of quartz, quartzite, and petrified wood. See Figure 71.

Blades: 11 cm. or less in length. Petrified wood, quartzite, quartz, igneous rock other than basalt.

1. *Multi-edged, bi-facial*: Flaked on two or more edges and on both upper and lower surfaces (Fig. 71, top row).
2. *Multi-edged, uni-facial*: Flaked on two or more edges, and on one of the flat surfaces.
3. *Multi-edged, no flaked faces*: Flaked on two or more edges, and on neither of the flat surfaces.
4. *Multi-edged, slightly flaked both faces*: Flaked on two or more edges, and to a small degree on both surfaces (Fig. 74, *f*).
5. *Single-edged, bi-facial*: Flaked on one edge only, and on both flat surfaces.
6. *Single-edged, uni-facial*: Flaked on one edge only, and on one flat surface.
7. *Single-edged, no flaked faces*: Flaked on one edge only and on neither of the flat surfaces.

Scrapers: Designated as ranging from discoidal to elongate in shape, 9 cm. or less in length, of same material as blades. Differentiated from the blades by greater thickness in proportion to length and width. In cases in which a small portion of the edge had been flaked to form a rounded edge the artifacts were arbitrarily termed scrapers instead of blades. Usually the scrapers possessed considerably less secondary flaking than the blades.

1. *Multi-edged, bi-facial*: Flaked on all edges and all surfaces, usually ovate in shape. Much thicker than blades, in proportion to length and width. Little or no secondary flaking (Fig. 74, *c*).
2. *Partially multi-edged, partially bi-facial*: Flaked around portion of perimeter, and on one or more faces. Generally oval or discoidal, and occasionally elongate in shape. In most cases it was difficult to determine the form intended in the finished product. Secondary flaking in a few cases.
3. *Keeled*: In almost all cases oval in shape. One surface shaped to form a definite dome or longitudinal keel. Opposite surface usually unworked (Fig. 74, *e*).
4. *Single-edged*: Usually very thick in proportion to length and width. Occasionally flaked over portions of the surface. Secondary and primary flaking.
5. *End or side*: A small portion of the perimeter heavily flaked. Usually thin in proportion to length and width. Secondary flaking.

Scraper Planes: 8 cm. or less in length, of quartzite or igneous rock. Tapering in thickness. Usually unworked except at the thick end. One surface in most cases was flat, while the other sloped. Discoidal in shape. Secondary and primary flaking (Fig. 74, *d*).

Choppers: Usually elongate, 12 cm. or less in length. Petrified wood or quartzite. Angular or circular in longitudinal cross section. A few large primary flakes were removed at one end. Rest of artifact often was unworked (Fig. 74, *a*).

Chisels: Thin, elongate implements. Less than 8 cm. in length, of petrified wood. A few primary flakes were removed from one end only. Usually this flaking was done on one surface only as well. Primary flaking (Fig. 74, *b*).

Drills: Less than 6 cm. in length, of petrified wood. Gravers, typically spike or spike with spatulate top, occasionally broken fragments showed usage as gravers or drills. Secondary flaking (Fig. 72, top row).

Milling or Crushing Artifacts:

1. *Problematical implements*: 15 cm. or less in diameter. Of quartzite. Large stones which had been abraded around perimeter. Usually not worked on surfaces. In most cases discoidal.
2. *Manos*: One handed, 16 cm. or less at greatest diameter. Of basalt, sandstone, or quartzite. Usually oval and ground on one or both faces (Fig. 75).
3. *Pestles*: Naturally shaped in long cylindrical form. Abraded slightly on both ends. Rest of stone unworked. Maximum length, 15 cm. Of metamorphic rock.
4. *Metates*: Flat slab type of basalt (27 x 24 cm.) or shallow basin of sandstone (50 x 34 cm.). Fragments appear to have come from implements of similar sizes (Fig. 75).

Pottery: *Lino Grey, Glaze I, Glaze on Yellow, Acoma Polychrome, Kana'a Neckbanded, Grey Culinary Ware.* All collected in sherd form. Occurred at random throughout the area of study, on surface in small amounts. The area under examination lies directly upon a historic trade route and probably explains the presence of various pottery types on the surface.

Miscellaneous:

Shell: One fragment of bivalve shell was found in the area. It had not been worked as far as could be determined. 1.3 cm. in length.

Turquoise: A fragment of polished turquoise was found in the vicinity of site A. It was polished on one side only, and had not been drilled. Whether it was of recent or ancient period could not be determined. 1.3 cm. in length.

In order that an idea may be gained as to the relative rate of occurrence of the various artifact types, the following table is appended. This table includes only those artifacts collected upon the Atrisco Grant or the original area of examination.

TABLE 10. NUMBER OF INDIVIDUAL TYPES COLLECTED FROM FIRST SEVENTEEN SITES

Blades:		
Multi-edged, bi-facial	70	
Multi-edged, uni-facial	3	
Multi-edged, unworked faces	2	
Multi-edged slightly flaked faces	8	
Single-edged, bi-facial	6	
Single-edged, uni-facial	5	
Single-edged, unworked faces	3	
Total	97	(31.7%)
Scrapers:		
Multi-edged, bi-facial	44	
Partially multi-edged, partially bi-facial	20	
Keeled	22	
Single-edged	5	
End or side	13	
Total	104	(33.9%)
Scraper Planes	14	(4.5%)
Choppers	31	(10.1%)
Chisels	8	(2.6%)
Drills	2	(.6%)
Milling or Crushing Stones	23	(7.5%)
Metates, Manos and Pestles		
Potsherds	18	(5.8%)
Projectile Points	6	(1.9%)
Miscellaneous	3	(.9%)
Total	306	

from original area of examination

COMPARATIVE DISCUSSION AND CONCLUSIONS

The points from Atrisco sites fall into three groups, an apparently early type, an apparently later type (the Atrisco type) which appears to be characteristic of the Atrisco culture, and a small heterogeneous group of leftovers.

The first type is known in this area only from one large point lacking its tip, and two stems which match the stem of the semi-complete point (Fig. 71, bottom row, *a*, *b*, *c*). The stems are long in proportion to the body, as seen in specimen *a*, and are of lozenge-shaped cross section, and thinned basally. The flaking is very smooth, the surface much more even than in the other types of points. In original length *a* must have approximated 60 mm., with a shoulder width of 34 mm. It is possible that the blades *b* and *c* may have been more slender and of the general shape of the Eden or Scottsbluff points, although this base is concave like that of *a* rather than straight like the bases of these other types.

Comparison of point *a* with finds outside the area immediately places it with the stubby Clear Fork II, as illustrated in Roberts (1940, Fig. 7, no. 6), except that the stem of the Atrisco specimen is slightly longer in proportion to the blade. As in the Texas specimens, this stem is beveled somewhat to the right. Roberts (1940, p. 75) equates Sayles' (1935) Abilene phase with that of Ray's Clear Fork types I and II points, roughly contemporaneous in time with the period of Folsom points which are not infrequently found with the Clear Fork types. A second comparison, and presumably accidental, is of specimen *a* and the early Palli Aike and Fell's Cave points illustrated in Roberts (1944, Pl. 12) except for the presence of two distinct "ears" on the base of the latter. Specimen *c* generally appears to have belonged to one of the long slim Clear Fork II points pictured by Roberts (1944, Fig. 7, no. 5), although with somewhat wider base and of less over-all length.

The second or Atrisco type (Fig. 71, middle row) is a well shaped point, smaller and lighter than the first, but averaging large in comparison to Basketmaker-Pueblo specimens. The blade is triangular, the base expanding and slightly convex or straight. Shoulders vary from sharp points to those which are somewhat rounded. The eight examples found so far range from 15 to 25 mm. in width and 22 to 45 mm. in length. (Length approximations are obtained on points with broken tips by projection of side lines.) The small point at the right end of the row is a white quartz chip, shaped and slightly beveled at the edges.

Perhaps the most interesting characteristic of the type (5 out of 8 specimens) is its tendency to show a definite rifling or beveling which would presumably insure whirling in flight.

The Atrisco point duplicates the Ventana Cave-San Pedro point (Haury, 1950, Pl. 22)

except that the latter is longer in proportion than most — but not all — of the Atrisco specimens. In both points the stem expands with sharp oblique tangs and convex base. The San Pedro point of eastern Arizona, pictured by Sayles and Antevs (1941) has more of a concave than convex or straight base and is longer and slimmer than the average of the Atrisco points. Atrisco specimens *d* and *e* of this type, however, when laid upon the actual-size photographs of the dart points, formerly known as of "Amargosa Phase I" from the lower Colorado River Basin area of California (Rogers, 1939, Pl. 16, Nos. 1, 2) match exactly in both size and shape. These points and the culture they represent now are designated "Amargosa III" (Haury, 1950, p. 193).

Associated with the Amargosa III points (aptly characterized as approaching the equilateral triangle in proportions) Rogers found large numbers of blades about 2½ times as long as the basal width and finished with bifacial flaking (Rogers, 1939, p. 62) which often made them as thin as dart points. This description and the photograph (Rogers, 1939, Plate 17, *h*) fits equally well the Atrisco blades (Fig. 71, top row). Most of these are triangular shaped with straight or convex base, although a few are of broad leaf shape and carefully finished with bi-face flaking covering the entire surface, or, occasionally, only the outer portions of a thin flake which has been shaped into a blade. In the Ventana midden leaf-shaped knives (or blades) were more common than any others. Haury points out that they show an extreme range in size, thickness, and workmanship (Haury 1950, p. 264), which are traits characteristic also of the Atrisco specimens. The smaller Atrisco blades approximate the larger points in size; the largest complete blade measures 95 mm. in length by 45 mm. in width, although fragments indicate much greater size than this in some cases.

Of the blade subtypes described for Ventana Cave, that of the Convex Base, with maximum width near the base, occurred in largest numbers and in greatest variation; these are represented in the cruder specimens from Atrisco. But even more recognizable as relatives of the Atrisco fine blades are the Ventana straight-based blades (Haury 1950, pp. 269 and 273) which, with those of round base, are considered

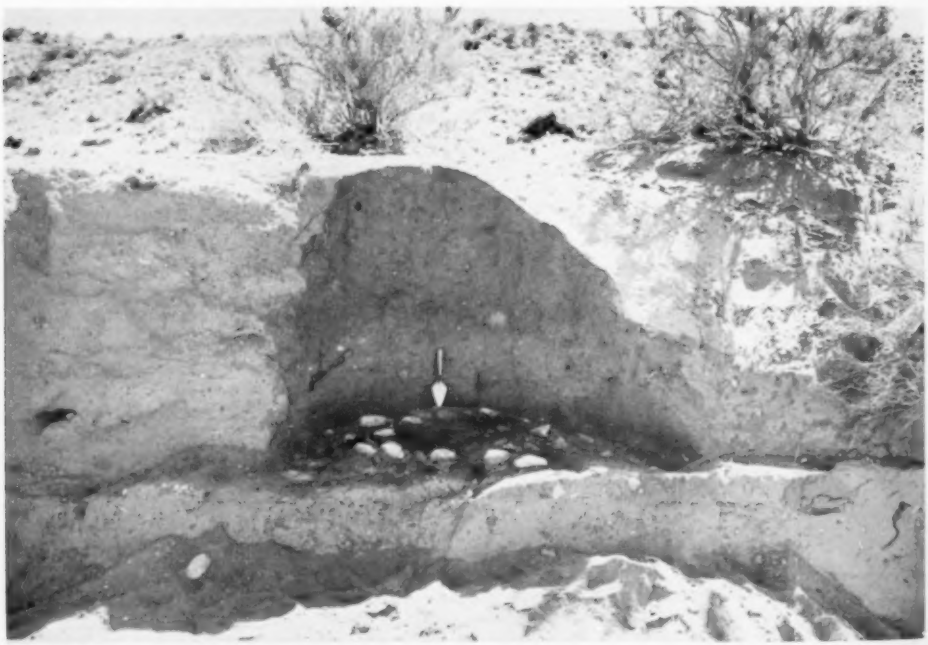

Fig. 73. Hearth 1, one meter below surface in arroyo bank.

to be a San Pedro stage component. It is possible that some of the smaller blades in both areas may have served as projectile points (Fig. 71, top row). Those of triangular shape "burst into prominence shortly before the arrival of pottery and then persisted" (Haury, 1950, p. 273). It is interesting to note that the equilateral triangle form with slightly convex base illustrated from Palli Aike and Fell's caves (Roberts, 1944, Pl. 12) could be lost in the Atrisco series.

Rogers points out that his first definite evidence of the hafted drill appears in his Amargosa III in five types, two of which are duplicated in the Atrisco material. His first (Rogers 1939, p. 63) is the spike-shaped form, illustrated in Figure 72, *a* and *b*, of Atrisco materials; his second type swells to a spatulate end, similar to that of *c* and *d*. The reamers or borers shown as specimens *e*, *f*, *g*, were for hand use and occur in Rogers' earlier periods and in the Ventana midden (Haury, 1950, p. 302) for which the spike shape and the drill with expanding flange likewise are illustrated.

One of the discouraging problems in characterizing a stone-work culture is the fact that after one has segregated the point and blade types which show some degree of consistency, a number of pieces of varying shapes and sizes are left over. For the Atrisco sites, this group is represented in Figure 72, middle and lower line. The first of the points in the middle line is somewhat crudely made of a chip, only partly worked on one side. The second is exceedingly well worked with parallel oblique flakes; it is beveled. The four small dark points vary principally in basal shape. Counterparts of each may be found in the Ventana cave collections but it is still possible that they may be Pueblo arrow points. Of special interest is the strongly serrate point with bifurcated base, a duplicate of San Jose points found near Grants (Bryan and Toulouse, 1943, Pl. XIX) and equally of some of the serrated points illustrated from the Ventana midden (Haury, 1950, Fig. 62). The large broken obsidian point remains unidentified in time or culture.

In the center of the lower line of Figure 72 is a small unbroken knife-like blade, excellently flaked from moss agate. It is not duplicated in the specimens pictured in the other reports

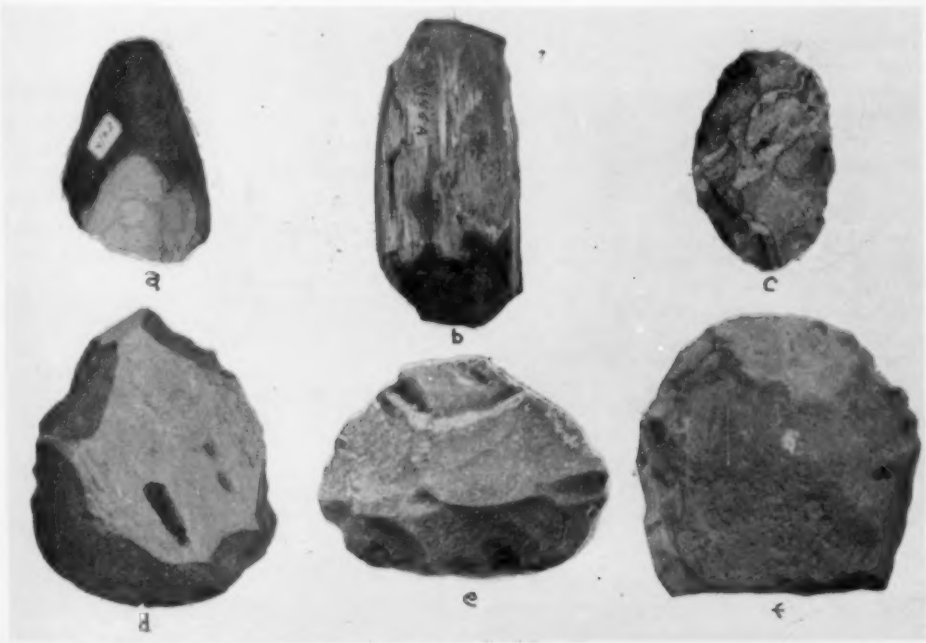

FIG. 74. *a*, Chopper; *b*, chisel; *c*, scraper: multi-edge, bi-facial; *d*, scraper plane; *e*, keeled scraper; *f*, blade: multi-edge, slightly flaked both faces. Length of *a*: 8.8 cm.

here quoted, although reminiscent of the slightly larger "four-pointed objects" from the Ventana midden, presumably used for scarification or some other fine cutting.

In summary, we may say that the Atrisco material appears to fall into two probable time categories. The first is that of the old Clear Fork culture of Texas, concerning which we still know little in the Rio Grande area. The second, which we shall speak of as the Atrisco focus, closely resembles the Amargosa III and San Pedro Cochise complexes which have been stated, respectively, to represent the last phase of prepottery culture in eastern California and in the southern parts of Arizona and New Mexico. Their periods are thought to have been of about the same approximate dryness as at present, a situation which fits with the discovery of juniper charcoal fragments in Atrisco hearth areas. Antevs suggested dates for the San Pedro stage at about BC 3000 to 500 (Haury, 1950, p. 297) were subsequently substantiated by Arnold and Libbey's (1950) radio-carbon date of 2463 ± 310. Antev's (personal communication) suggests this same dating for Atrisco on the basis of geological manifestations.

The similarities between the San Pedro and the Amargosa III cultures are marked; the most distinct differentiation between the two appears to be the presence of metates and manos in the former and lack of grinding stones in the latter. In investigating possible linkage of the Atrisco material to either we note specific duplication of Amargosa III in point shape and size, in similarities in shape of knives and blades and in their relative abundance, in relative shortage of scrapers, and in specific similarity of drills. The primary difference is the presence of small one-handed manos and of whole and fragmentary grinding stones, either of volcanic material shaped with slightly concave smooth surface or of boulders of exfoliated sandstone showing basin-shaped depressions. The Amargosa people apparently were hunters; those of Atrisco likewise were hunters but also gatherers and possibly even farmers, if we accept the dating for corn in Bat Cave, some 135 airline miles to the southwest, at 1000 B.C. or earlier.

The San Pedro culture was one of both hunting and gathering, and possibly of farming. That more grinding implements were found in southern Arizona San Pedro sites than in Atrisco sites may reflect the relative abundance of game animals in the Albuquerque area rather than mere preference in food. The points illustrated for eastern Arizona and for Ventana cave are similar to the typical Atrisco points except in averaging longer, although some of the Atrisco specimens are of San Pedro proportions. The knives and blades, the scrapers of various types, planes, choppers, drills, etc., and the manos and metates generally parallel those of the San Pedro sites. The large number of cutting implements indicates a considerable reliance on hunting, even though the number of points is small in relation to numbers of other implements. That the people would be less likely to lose points in camp-kitchen use probably explains why larger numbers are not found. Except for the presence of metates and manos one might be inclined to classify the Atrisco material as of the Amargosa complex. The similarity of Atrisco material to that described for the Concho complex (Wendorf and Tully, 1951) is marked, although grinding tools are rare in the latter. Since Atrisco appears to parallel equally well (with the slight exception of point proportions) the San Pedro chipped and flaked stone work and has, in addition, the grinding implements so characteristic of San Pedro, it is felt that the more accurate classification would be indicated in listing it as the Atrisco focus of the San Pedro phase of the Cochise culture, differing slightly from other foci of the same phase but identifiable as the Middle Rio Grande manifestation of the same basic culture.

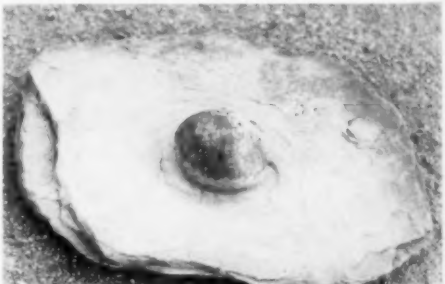

FIG. 75. Metate and mano found together in blowout site. Length of metate, 50 cm.

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A PALEO-ESKIMO CULTURE IN WEST GREENLAND

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DURING A TRIP TO GREENLAND in the summer of 1948 Hans Mosegaard, a well known amateur archaeologist, visited Sarqaq in the Ritenbenk District of the northern part of Disko Bay. Directly west of the present settlement near the low cliff along the beach Mosegaard located remnants of an old midden layer, of which he excavated a surface area of 12 sq. m. with a culture stratum reaching a depth of 30 cm. The find consists of 182 artifacts; stone refuse is plentiful, but only a few bones, none worked, were preserved. No house ruins occur in connection with the culture layer, and Mosegaard was unable to establish any regular arrangement of the many stones scattered at the area.

Sarqaq can be added to the series of sites yielding collections of Eskimo stone artifacts in Disko Bay. The Disko Bay collections, made at the end of the 19th century, are large. In 1907 the material formed the basis for Solberg's (1907) postulation of a "stone age" in west Greenland. The absence of organic material in these collections has, however, been explained by Therkel Mathiassen as due to the fact that archaeologists have not worked at these places, and the middens probably often have been washed out by the sea; in classifying the Eskimo cultures of Greenland into periods, Mathiassen places this "stone age" material in the Inugsuk culture and later periods, considering an essential part of the types as local developments (Mathiassen, 1934, p. 173). He realizes, however, the strange circumstance that the material from the large, systematically excavated settlements from the Thule and Inugsuk cultures of west Greenland shows a remarkably poor representation of stone objects, despite their abundance in Solberg's finds (Mathiassen, 1934, p. 175). Now considering the Sarqaq material—typical for these stone collections, and carefully excavated—this disproportion is further strengthened, if we include the negative feature that a number of representative types of stone of the Thule, as well as the Inugsuk, cultures are lacking in Sarqaq. The most important of these missing types are the drill point, ulo, triangular harpoon blade of slate, and hammer-stone. Conversely, certain Sarqaq types are unknown or very rare in these latter cultures; such characteristic forms as rhombic-lanceolate weapon blades, slender side blade, narrow, concave based blade, micro-core and small oval lamps are not found at all.

The position of this west Greenland group of finds is easier understood if we consider the fact that all of the types are demonstrable in the early Eskimo cultures in Alaska taken as a whole, and several of them in the Dorset culture too.

THE SARQAQ COLLECTION

In the following description of the 182 stone artifacts, the whole material has, for the sake of shortness, been classified only according to primary types, so that, for example, the raw material and the method of grinding or chipping will be specified under each of the groups. Where nothing to the contrary is stated, the raw material is the hard silicious slate of Disko Bay, in character considerably closer to flint than to actual slate.

Slender, symmetrical blades. This numerically largest group consists of 58 points which have chipping on both surfaces, and a marked slender form with a narrow or pointed base (Fig. 76, *1-10*). The length varies from 1.8 to 5.3 cm. One specimen has a distinct, tapering tang (*1*), but is not essentially different from 13 points, 7 of which are flint; long narrow blades with faintly marked shoulders (8) or shorter specimens approaching rhomboids in shape (3-5). These in their turn show transitions to blades of a pointed-oval shape (*9, 10*), the dominating form among the symmetrical blades. A number of this class have symmetrical ends, the rest have a short, straight or rounded base. Finally to be included are a specimen of silicious slate with a relatively wide, concave base (6) and 4 larger points with straight, parallel sides (*7*), all of them broken at the base. A few of these 58 blades have the original flake surface preserved on the inner side. While none of the flint blades are ground, half of those of silicious slate show signs of rubbing. Finely serrated edges occur (9).

Heavy, symmetrical blades. A smaller group of 14 specimens are different from the preceding in that they are considerably larger and more rudely worked. The only complete blade is lanceolate, 8.2 cm. long and 2.5 cm. wide; judging from the width, it is the smallest in

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the group, the other fragments being up to 4.1 cm. across. All of them are of unground silicious slate. Corresponding blades are depicted by Solberg and interpreted as lance blades (Solberg, 1907, Pl. 11).

Small, slender side-blades. There are two almost complete examples of small and thin, carefully worked blades, which were probably inserted in weapon heads (Fig. 76, *11, 12*). The type has a straight and a convex edge, and both ends are pointed. No. *11* has an unworked inner side, while *12* is double chipped; both are of flint. Double chipped are also 18 fragments—of which two are flint—which can rather safely be assigned to this class.

Wide, heavy side-blades. To this category belong 5 blades of silicious slate, 3.7 to 7.4 cm. long; most likely knife blades. A smaller, partly ground specimen (Fig. 76, *13*) is represented by two specimens, the remaining three are larger and unground.

Burins. 26 specimens, 2.1 to 4.2 cm. long, are classified as burins, a designation to be discussed below (Fig. 78, *1-4*). Five of these are of flint, the rest of hard silicious slate. All of them are chipped on both sides, but a more or less distinct trace of grinding can be seen where the sides meet at the oblique, sharp or rounded front edge. From this front edge one or more "burin-blows" are struck. On a few specimens the last blow has not been successful or splinters have been pressed off along the oblique front edge and thus damaged the implement. Most often, however, a very suitable, short transverse edge or a strong pointed corner, and the facet with the negative bulb of percussion, is preserved. Seventeen complete specimens can be described as oblique angle-burins (Fig. 78, *1, 3, 4*). On one specimen (3) burin-blows were struck from each end, and a double-burin with two good edges resulted. A single burin can finally be described as an "ordinary" or chisel-burin (*2*).

Figure 78, 5 shows one of two similarly formed sliver-like spalls struck in resharpening the burin; both of flint. The corner, which functioned as working point before being removed, has a break, as the result of use, which made the implement unusable, whereas the working point on the resharpened burin can be seen to have been suitable.

Scrapers. There are 6 heavy, high-backed, concave side-scrapers such as those in Figure 76, *18, 19*; all are of flint. No. *18* is the most common shape. Of convex end-scrapers of flint there are 10 specimens (Fig. 76, *20-22*), which can be divided into two main types: A thick hoof-shaped (*20*), found in two specimens, and a thinner type with straight side edges and pointed corners (*21, 22*). Three of this shape are small and triangular like *22*.

Scale-shaped piece of flint. A specimen measuring 2.1 by 1.8 cm. (Fig. 76, *15*). Three edges have a split appearance and the upper and lower surfaces are equally vaulted. Apparently it is the type known from Europe, for example in the Komsa culture at the Arctic shore of Norway, and in northern Asia, from late Paleolithic to early Neolithic time; in French literature called *pièce écaillés*, a kind of knife or—as suggested by H. Breuil—small, used-up nuclei (Breuil, 1924, p. 528). Eighteen specimens of this type were found by the author in a house ruin from 14-15th century in northeastern Greenland belonging to the Thule culture influenced by Dorset culture. (Full results of this research are not yet published.)

Adze-blades. Six adze-blades were found, all of silicious slate. A broad, two-sided specimen has flat, chipped sides with traces of grinding (Fig. 76, *16*). The remaining five are narrow and chisel-shaped, 3.8 to 5.6 cm. long, with only the faceted edge ground (Fig. 76, *17*).

Lamps. One-half of a small flat, approximately oval, soapstone lamp is 6.1 cm. across (Fig. 77). The length was evidently only 9-10 cm. From the sharp rim the low, sloping sides grade evenly into the bottom, and there is thus no distinct base to it. Two carved oval holes near the rim further suggest that this lightweight lamp of only 0.4 cm. thickness may have been suspended. That it was used solely for light is certain. From another soapstone lamp of the same flat, oval form a smaller fragment has been preserved. This lamp has been of the same diminutive size, but has thicker walls of 0.9 cm.

Cooking pot. A 4.9 by 4.5 cm. large fragment of a soapstone container with thin, keen rim belongs to a straight sided jar at least 4.5 cm. high.

Micro-core. A small core of milk-white quartz, 2.4 cm. high, 2.3 cm. long and 1.0 cm. wide, has a keel-shaped back, fluting along one lateral edge and a striking platform with preparatory flaking (Fig. 76, *14*). No regular microlithic flakes were found.

Refuse. In all, 304 bits of refuse are found in the collection. The raw materials are divided as follows: 139 of silicious slate, 64 of flint (of which the main part are irregular chips, and only a few approach true flakes and microliths in form), 34 rough pieces of quartz and 67 of rock crystal.

The rhomboid-lanceolate end-blade is a rare type in the Dorset culture; the form is known only from a few finds described by Wintemberg (1939, p. 83) from Newfoundland. These sites date from as late as the 13-15th century. But all the Sarqaq variations of the blade type are old, widely spread forms in North America and in northern Asia. And the lanceolate blade with or without the faintly marked shoulders are commonly found in the Ipiutak culture (Larsen and Rainey, 1948, Pl. 14), while the third variety is very close to the diamond-shaped blade in the Near-Ipiutak culture, where the two other forms are also found (Larsen and Rainey, 1948, Pl. 80). The

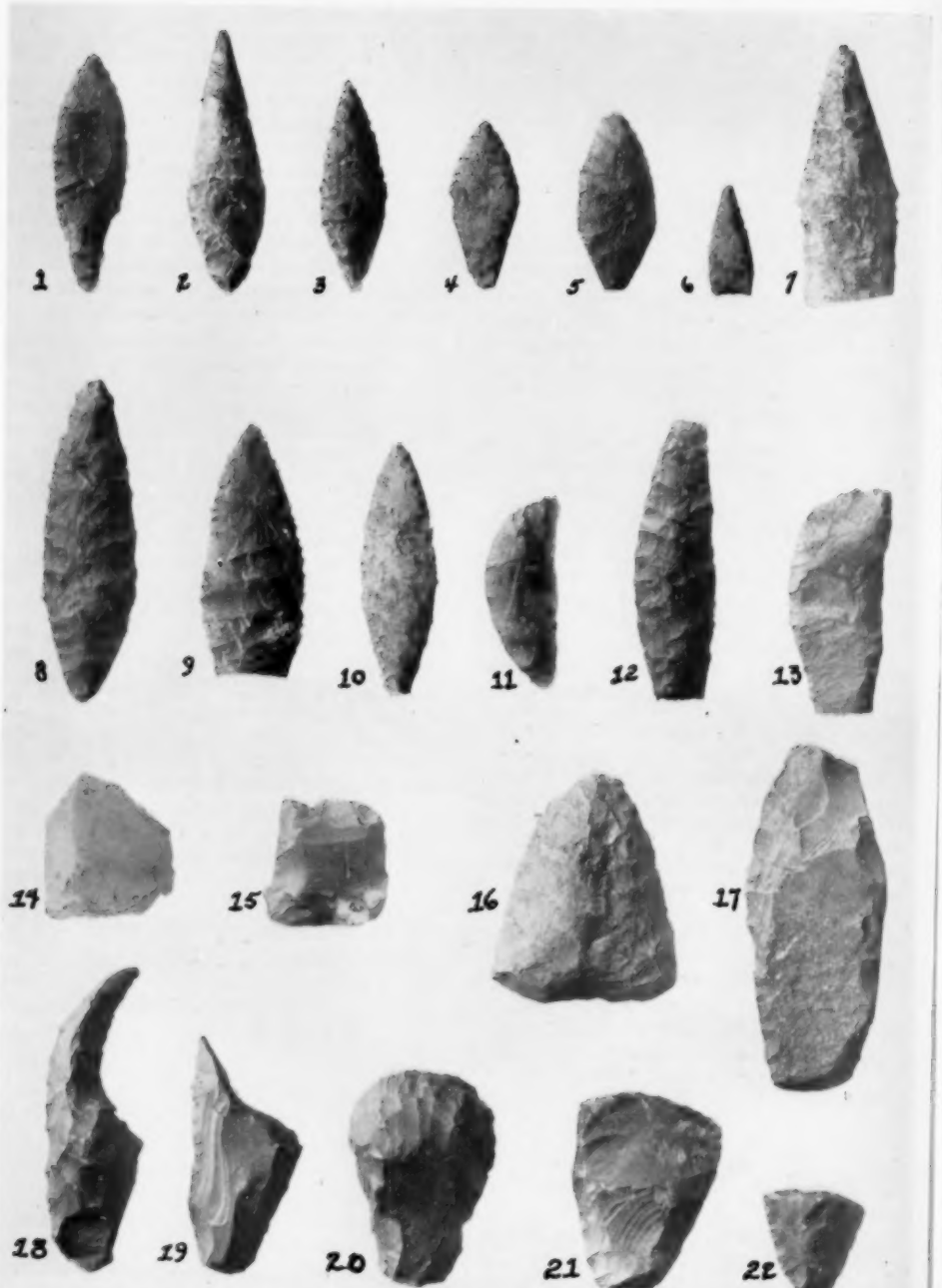

Fig. 76. Artifacts from Sarqaq. Natural size.

little narrow, concave-based blade is a typical, if somewhat short, example of this rather usual west Greenland form (Solberg, 1907, Pl. 12, 33-37). It falls within the range of variations of the triangular blade with concave base in the Dorset culture, but is very different from the typical form (Wintemberg, 1939, Fig. 4, No. 2, 6, 9, and Holtved, 1944, Pl. 2, 1-4). On the other hand it has a closer parallel in Ipiutak's arrow blade, type 2, and in Near-Ipiutak (Larsen and Rainey, 1948, Fig. 20, a, and Pl. 80, 15-22). The double-pointed slender side blade for weapon-head is not known from the Dorset culture. But quite corresponding forms are seen in the Ipiutak complex (Larsen and Rainey, 1948, Pl. 2, and Pl. 80, 26-31), and in the Denbigh Flint complex (Giddings, 1951, Fig. 61, A, 8).

As regards the scrapers, the convex end-scraper has a very wide distribution in the Eskimo area, but the little triangular type with sharp corners is prevailing in the oldest Eskimo strata, and the thick, hoof-shaped form is very similar to some specimens in the Ipiutak culture (Larsen and Rainey, 1948, Pl. 18, 3). The concave side-scraper made of a thick flake is less frequent in our material than the end-scraper, but yet it occurs by the hundreds in Disko Bay. Relatively few side-scrapers are known from the Dorset culture (The Thule district, north Labrador and Newfoundland), and the specimens are chiefly made of thin chips, none of them are of distinct forms such as the chipped high-backed type from west Greenland. Much more similar is the side-scraper with completely worked outer surface in the Ipiutak culture, where it is one of the most important elements (Larsen and Rainey, 1948, Fig. 24), and—especially—the type of the Old Bering Sea culture with straight grip-piece (Collins, 1937, Pl. 41, 22).

The microlithic core indicates the lamellar flaking characteristic of the Dorset culture. But at the same time the core type is of special interest. No cores from the Canadian Dorset are noted in the literature, but from Newfoundland Wintemberg (1939, p. 90) mentions microliths, which could have been struck from prepared cores. The Sarqaq specimen, with its diminutive size and narrow spall-like form with fluting along one lateral edge, and the striking platform and preparatory flaking is identical with the characteristic type described by Rainey (1939, p. 387) from the old Campus site in Alaska, and consequently as well with the parallels shown from Mongolia (Nelson, 1937, p. 270). The same type is also found in Verkholenskaja Gora in the Irkutsk region in an apparently late mesolithic context (Field, 1937, Fig. 1, 6, 7). The Sarqaq specimen is not isolated in west Greenland; Solberg (1907, Fig. 14) has pictured a conical core, but the above described form is the common one and is found in several examples in the collections from various sites in Disko Bay. A special mark of a number of these is the acute angle, 30°–45°, which the fluted edge makes with the striking platform. Microlithic flakes are found by the hundreds in the same finds.

The nicely done little flat, oval lamp of soapstone—the first one of this kind from west Greenland—which is represented by two fragments, is rather unusual, but resembles the commonest and probably oldest of the two main types of the Dorset culture. This flat type is found in sandstone from the Thule district (Holtved, 1944, Pl. 2, 34-36), and thin-walled, oval, but essentially deeper, lamps of soapstone are known from Melville Peninsula (Rowley, 1940, Fig. 1, a) and Button Point, Baffin Land (Mathiassen, 1927, Fig. 70). Also in Alaska this lamp type, however, is an old and widespread form.

THE BURIN IN THE ESKIMO CULTURE

Since the type of implement described above has not been previously taken for a true burin, it will be the object here of a more detailed discussion. Solberg (1907, Pl. 6) was the first who called attention to the type and described it as a special west Greenland form of drill point. He was, however, aware of the strange circumstance that—in spite of being one of the most common artifacts—it was of extremely unappropriate form, in that all of the specimens had damaged points. Later Mathiassen (1931, p. 93) classed it with west Greenland Inugsuk, and succeeding cultures, and named it boot creaser, since he regarded the group as broken pieces which originally looked like another of Solberg's types: the creasing stone (Solberg, 1907, Fig. 15-23). These, however, always occur unground in distinction to the majority of the "damaged type." The Danish physician Pfaff, who for twenty years was an enthusiastic amateur archaeologist in Greenland, noted in an inventory of his collection,

that in all his years he had sought in vain for a complete specimen of this type! His misfortune became, however, comprehensible to the author after examination of some Greenland specimens, which both in appearance and in their method of manufacture looked like the burin so well known in the Old World. That the type should have a function as a cutting instrument for harder materials, and could therefore be paralleled with the burin, has been proposed by de Laguna (1947, p. 193) on the basis of Canadian specimens. Work in bone should then explain the "damage" of the edges, and Collins (1950, p. 25) joins in this interpretation.

The Greenland examples of the type show that we are not only dealing with an instrument with the same function as the burin, but with a true burin, which in the most original form fulfills the conditions in the definition of the Old World's burin. Even on the Sarqaq specimens several of the facets and the two chipped-off spalls show respectively the negative and the positive "bulb of percussion." This identity admits interesting perspectives with regard to the origin of the cultures in question, especially since burins of characteristic European forms have now been recognized by Giddings in Alaska in the Cape Denbigh Flint complex (Giddings, 1951, Fig. 59-60).

It can scarcely be doubted that the burin in west Greenland is a special element of the material dealt with here, where it comprises $^1/_7$ of the Sarqaq find and an even greater percentage in the material from Kekertaq and Sermermiut. Thus only eight specimens occur in all of the finds belonging to the Inugsuk culture and later cultures in west Greenland. This small number seems striking, not the least considering that these eight are spread over five centuries, from the earliest Inugsuk culture until the 17th century, and in view of the fact that the type is unknown in the Thule culture it seems indeed even more reasonable to see it as a foreign element.

Fig. 77. Lamp fragment from Sarqaq. Natural size.

Figure 78, *6-11* shows some different forms of the Greenland burin. Two characteristic flint burins of the chisel type from Disko Bay (*9*, *10*) have traces of grinding near the front edge as all of the Sarqaq specimens, but several are completely without this light grinding, a character which, in comparison with European burins, certainly should not be weighted too heavily, since it is only an adoption of a rather common feature of the flint material in the early Eskimo cultures, particularly the Dorset. Figure 78, *11* is a little angle burin from a flint flake which is without reworking or grinding on the surfaces, only the front edge and one longitudinal edge having been retouched. A parallel to this west Greenland specimen is 6 from Scoresby Sound, one of four unground flint burins from the same site, two of which resemble 6, whereas the fourth, pictured as 7, has the outer surface reworked and an especially carefully made "working point." Finally 8 is a double angle burin with the enclosed edge trimmed; the specimen is of unground flint with the original flake surface preserved on the inner side except for a retouch at the front edge, and belongs to a find of unmistakably Dorset character from Pearyland (Knuth, 1948, Fig. 7).

The corresponding burin type from the Canadian Dorset is generally flat with the surfaces ground plane (described by Leechmann, 1943, p. 371, and Collins, 1950, p. 25), a type which in Greenland, however, is represented only by one single specimen from the Inugsuk find dated to the 13-14th century (Mathiassen, 1930, Pl. 14, 8). On the other hand there are—to be distinguished from the rest of the Canadian specimens—seven burins in the material of the Danish National Museum from the Dorset site Button Point, North Baffin Land (Mathiassen, 1927, p. 207), which are of unpolished flint and with the inner surface unworked. All are of quite diminutive size and similarly formed; two with the outer surface chipped (Fig. 78, *13*) and the rest only with retouch along the front edge

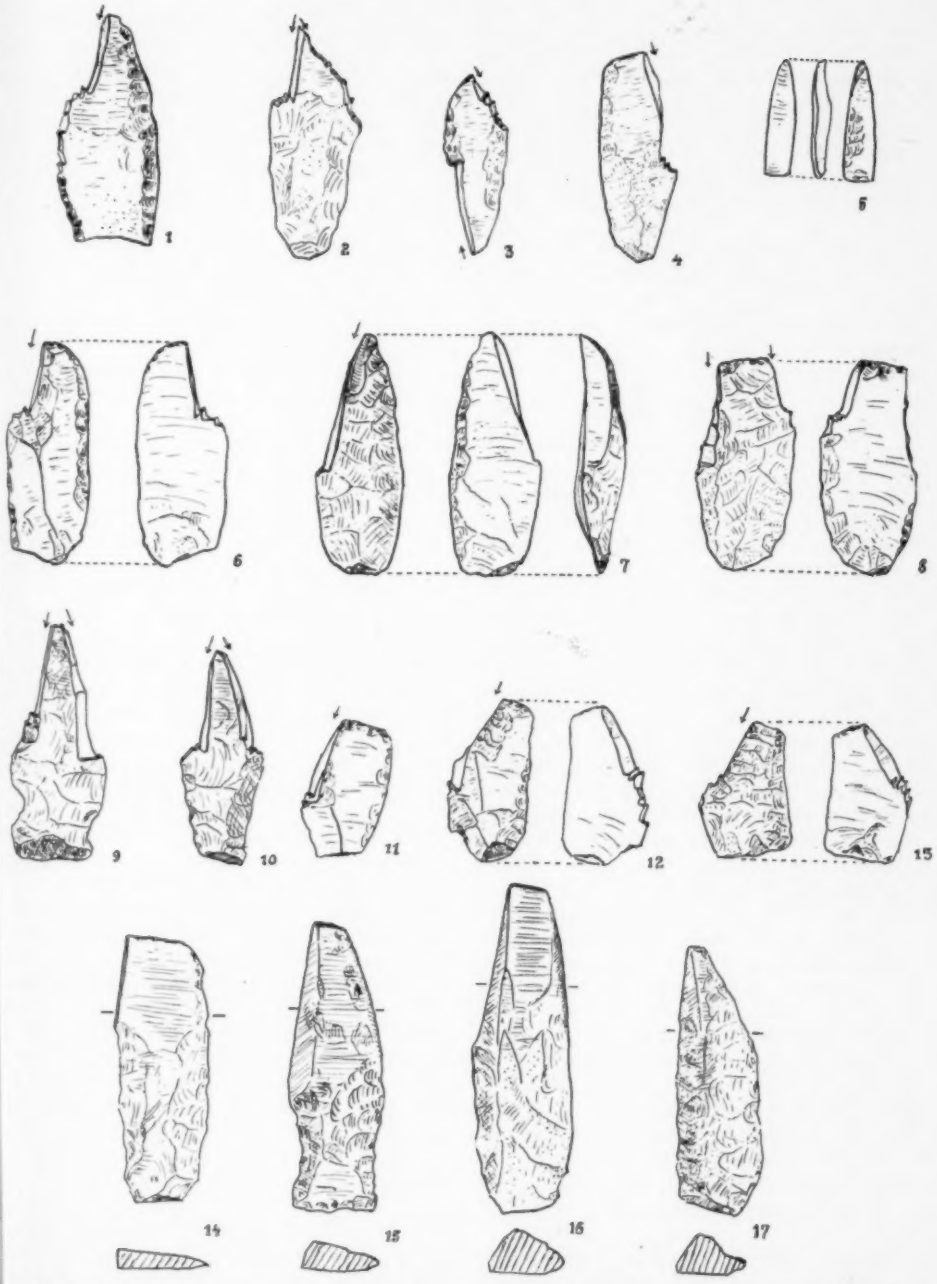

FIG. 78. No. *1-13*: burins. *1-4*, from Sarqaq; *5*, resharpening spall from Sarqaq; *6-7*, from Scoresbysound; *8*, from Pearyland; *9-11*, from Disko Bay; *12-13*, from Button Point, Baffin Land; *14-17*, three-sided drill points from Disko Bay. (Natural size).

and parts of the side edges (Fig. 78, *12*). From the Old Bering Sea culture are found some "implements with rubbed edges" of slate, very similar to the Canadian Dorset type (Collins, 1937, Pl. 39, 19-22), and probably the small ground instruments of silicious slate in the Ipiutak culture, called small chisels, are similar tools (Larsen and Rainey, 1948, Pl. 10, 14, 15).

In these forms—including the majority of those from Canada—we probably have the prototype of the iron blade in the typical splitting-knife of the Eskimos. In the Old Bering Sea culture stone and iron blades are used contemporaneously (judging by the blade grooves) in similarly formed composite knife handles (Collins, 1937, Pl. 38, 5-7); the dimensions of the groove for the stone blade correspond closely to the above mentioned burin-like specimens in the culture. Unfortunately no iron blades are preserved. But this short, strong form of knife handle has a longevity and wide distribution in the Eskimo cultures; and among the western Eskimo, where the splitting technique by cutting was in use longer than farther east, examples showing the form of these iron blades are found, viz. in the splitting knife. The conformity with the original burin-like stone blades is striking: corresponding size and shape with a blunt, oblique front edge and a short, transverse edge or pointed corner. We often even find a parallel to the hollow of the facet on the true burin in a notch-shaped curve on the iron blade, a trait making the implement more effective (Hoffman, 1898, Pl. 19, 4, and Birket-Smith, 1945, Fig. 174, a). In this connection we ought to mention a penetrating observation of Rasmussen (1932, p. 101) from the Copper Eskimo concerning this type of knife: ". . . by continually passing the notch (of the blade) through the same groove the horn was at length cut through. Common paleolithic instrument; has also been used in Denmark, where flint took the place of iron." The relation to this old type was even closer than could be supposed by Rasmussen, and is also a remarkable example of the development right up to modern time of a specialized paleolithic tool.

We have, however, already with most of the Canadian Dorset specimens got away from the classical burin, but the question of where the border between burin and burin-like should be drawn has hardly any practical significance. The point is that the true burin occurs. And as such it is an important element to be added to the paleo-Eskimo culture, when connections with the proto-Eskimo strata and the Old World are to be established. Thus is the type indeed to be seen in relation with the Eurasiatic burin forms of Cape Denbigh. The conformity here is evident. A common characteristic—contrasting to the Eurasiatic burin—is the chipping frequently covering most of the outer surface. There is also a close resemblance between specimens like the chisel-type figured by Giddings (1951, Fig. 59, *a*, 3) and our Figure 78, *10* from west Greenland; the Denbigh double burin (Giddings, 1951, Fig. 60, a, 2) and the Pearyland specimen in our Figure 78, *8*; and finally the Denbigh angle burins (Fig. 60, *a*, 6, *7*) and the burin from Scoresby Sound in Figure 78, 6.

In connection with the burin in west Greenland we shall here briefly discuss what is for this territory a special development of the type, which has a definite significance for the question of a contact between the culture dealt with here and the Thule culture in west Greenland, and the relative chronology. It is concerned with the *three-sided drill point* of ground silicious slate, a characteristic, powerful point, which is found in very large numbers in several of Disko Bay's middens as Kekertaq and Sermermiut (Solberg, 1907, Pl. 5). The absence of drills is a characteristic which Sarqaq has in common with the Dorset culture, and to some extent with the Ipiutak culture (Larsen and Rainey, 1948, p. 105). The appearance of this special drill point type, then, demands an explanation, and that may be found in the burins described above. That the type belongs to our west Greenland stone material seems to be quite clear. The drill point of the Thule culture is different, viz., the type with a wide, flat tang, and a thinner point; in the Inugsuk culture it is also this type which is the most common, whereas the three-sided drill point is only known in two examples from the west Greenland Inugsuk culture, one of them from Disko Bay (Mathiassen, 1934, p. 154 and 1936, p. 75). The chronological position of the type as compared to the burin is indicated by the fact that it does not occur in Sarqaq. And a purely typological observation of the different forms seems indeed to show a development

from burin to drill point, a development which does not exclude, however, the continued existence of the burin. Mathiassen (1933, p. 89), aware of variations in the type remarks ". . . sometimes the point is rather narrow, sometimes wider, indeed in some cases it is so wide that one begins to doubt whether they really are drill bits, but as there is every kind of transitional form, and apparently they are the same implement in all cases, it is probable that they are drills." Some forms of the drill point are illustrated in Fig. 78, *14-17*. No. *14*, of which there are very few examples, distinguishes itself from the burin by its polished facet, the broad flat point is not very suitable for drilling, but protrusions and traces of smoothing resulting from wear show, however, that it has been used for this purpose. Nos. *15, 16, 17* indicate the development toward the thick drill with narrow point and almost equilateral cross-section; *16* is the most frequently occurring form. No. *15* is of flint, a material otherwise rarely used.

The cause of this development can in all probability only be explained by a contact with the drilling-technique of the Thule culture. The lack of the three-sided drill point consequently places Sarqaq as an early, pre-Thule, phase in the culture dealt with here.

SUMMARIZING REMARKS

In the analytical review of the Sarqaq types, these have continually been compared with the Dorset culture, with which many similarities turned up. But at the same time important differences were demonstrated; thus none of the types are restricted in distribution to the Dorset culture, yet one element, grinding of flint, is a characteristic of this culture. In other words, the representative types of the Dorset are not found; especially striking is the absence of the typical wide, triangular blade with concave base, since this is not even known in a single specimen from the whole of west Greenland. Add to this that three Sarqaq types are unknown in the Dorset culture—narrow side blade for weapon head, rhomboid flint blade, and prepared core with lateral fluting. Two others are absent in the here occurring stable form—the relatively long, narrow point with concave or straight base, and the thick, chipped concave sidescraper. Finally the dominating type in Sarqaq, the lanceolate weapon blade, is only known from Newfoundland.

In Alaska, on the other hand, all of the Sarqaq types are found again; this is true for the three cultures, Ipiutak, Near-Ipiutak, and the Cape Denbigh Flint complex, taken together. The six types discussed are distributed in the following way: narrow side blade for weapon head, narrow point with concave or straight base, and the lanceolate blade are common to all three of them (in that the resemblance with Cape Denbigh is only valid for the form). The thick, chipped concave sidescaper is a well-known Ipiutak and Near-Ipiutak type; rhomboid flint blades are found in Near-Ipiutak; and the prepared core with lateral fluting is known from the Cape Denbigh Flint complex.

Probably the Sarqaq material can be interpreted as evidence of an Eskimo culture, closely related to the earliest Eskimo cultures in Alaska, which appeared in west Greenland after wanderings without lengthy stops; i.e., without development of local types in the eastern areas, contrary to what happened to the Dorset culture. And the source of this culture current seems to have been different from that of the Dorset culture. Consequently the west Greenland culture can scarcely be classified as Dorset culture, in spite of three Dorset types occurring in some of the collections from Disko Bay: the oblique, rounded knife blade, the end blade with side notches, and the convex scraper with flaring edges (Solberg, 1907, Pl. 3 and Pl. 1). The west Greenland culture was apparently after the Sarqaq phase to some extent influenced by the Canadian Dorset. But that we are dealing with a paleo-Eskimo culture is evident. I shall therefore suggest the term *The West Greenland Paleo-Eskimo Culture*.

Even if it is not possible to advance an absolute date for the west Greenland paleo-Eskimo culture, it seems possible to clarify the relative position with regard to the Thule and Inugsuk cultures. *The west Greenland Paleo-Eskimo culture must have reached Greenland before the Thule culture.* Thus the collection from Sarqaq has no Thule, nor Thule-influenced types. This is analogous with the relation between Dorset and Thule culture in the Thule District (Holtved, 1944, p. 61). But the Dorset culture in the Thule District expired before

the immigration of the Thule culture, whereas *the west Greenland Paleo-Eskimo culture continued to exist parallel with the Neo-Eskimo culture.* In west Greenland, for example, we see among the burin-using Eskimo a development of the three-sided drill point under the influence of the drill technique of the neo-Eskimo, and there are evidences of influence in the opposite direction. But nothing definite can be said about the nature of the interrelations as long as only the Thule and Inugsuk sites are excavated, nor of the length of this continued existence of the paleo-Eskimo in west Greenland.

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THE VIRU VALLEY SEQUENCE: A CRITICAL REVIEW*

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THE VIRU VALLEY Project of 1946 was undertaken as an intensive and integrated study focusing the research of a number of anthropologists on the problems of a single, relatively small valley on the north coast of Peru. The ideal of the project was an analysis of the cultural history and prehistory of the Viru Valley from the time of earliest human occupation to the present. The final reports of the participants are now beginning to appear (Ford and Willey, 1949; Ford, 1949; Bennett, 1950) and these document the very substantial success of the project.

Special importance attaches to Ford's report because of his stimulating discussion of the nature of the problems involved in stratigraphic analysis and in surface surveys. Ford's statement of theory and method and his ingenious graphic presentation of data are of general interest to archaeologists and can be expected to influence students of prehistory working in fields other than Peru. The merits of this report have been discussed briefly by Evans, also a participant in the Viru project (Evans, 1951).

Before 1946, the North Coast chronological framework was essentially a sequence of decorated pottery types based in part on grave stratigraphy and in part on typological seriation. The Viru project concentrated much of its attention on habitation sites and refuse deposits and secured stratigraphic sequences from preceramic times to the Inca period. This Viru work revealed certain errors in the older chronological scheme; the most important change resultant from the study was the shifting of the Gallinazo style from a post-Moche[1] to a pre-Moche position.

Detailed reports on the stratigraphic sequences found in 1946 have not yet appeared. Ford summarizes the data, however, as a basis for his main project which is the dating of surface collections from the sites surveyed in the valley. Additional information on the Gallinazo style is given in Bennett's report. Enough information is already available to permit the definition of interesting problems and to raise some questions regarding the conclusions drawn by Ford and Bennett. It is a compliment to the scholarship of both writers that a reader of their reports can attempt a critical analysis even without access to the Viru collections.

Since Ford's report presents a summary of the whole Viru sequence, it will be convenient to base our analysis on it, referring to Bennett's Gallinazo study and the preliminary reports of the other Viru project participants as they relate to Ford's presentation. We will start with a discussion of survey and classification methods and then take up specific problems of relative dating in their chronological order.

THE SIGNIFICANCE OF THE "MEAN CULTURAL DATE"

Ford and Willey[2] carried out a surface survey of the whole Viru Valley, in order "to date, within as narrow limits as possible, a substantial number of the old occupation sites" (Ford, 1949, p. 31). The success achieved was such that Ford offers the study as "an exposition of some techniques for measuring culture history and time change which are slightly different from, and in some details possibly are an improvement on, the current modes of handling chronological problems." The surface survey was carried on in conjunction with excavation of selected sites. Sherds from the various stratigraphic levels were classified and the various types were graphed as percentages.

* The author is indebted to John H. Rowe for guidance and criticism in the preparation of this paper. Appreciation is also expressed to Alex D. Krieger, A. L. Kroeber, T. D. McCown and Gordon R. Willey for many helpful suggestions.

[1] Throughout this paper, the site name "Moche" will be used to designate the style called "Mochica" in the Viru project reports, the Proto-Chimu or Early Chimu of the older literature. This usage follows a suggestion made by Rowe (Ms.) who points out that the word Mochica has definite ethnographic and linguistic connotations which are undesirable in an archaeological label.

[2] For convenience, only Ford will be cited hereafter in this paper with reference to the surface survey and Viru classification. Strong, Evans, and Collier undertook the contemporaneous excavations, and the classification and much of the cultural analysis was a joint product of the various participants in the Viru project.

A master chart covering virtually the entire occupation of the Viru Valley by pottery making groups was set up from the excavated data, and ceramic periods were defined. At the same time, sherds were collected from a wide variety of surface sites, and also converted into graphs of type percentages, each surface collection being treated as equivalent to a single stratigraphic level. The surface site graphs were then compared with the stratigraphic chart, and the period in which the best matching occurred was considered to be the "mean cultural date" of the surface collection. By this seriational method Ford assigned approximately 270 surface sites to ceramic periods (Ford, 1949, Appendix A).

The casual reader may gain the impression that this ceramic period represents the average (longest) period of occupation of the site. It should therefore be emphasized that the improved techniques presented do not "date the site," but only the surface sherds. The data given by Ford appear to substantiate the conclusion that a representative collection of surface sherds does reflect a cultural unit in time. Both the check samples from excavation, and the rarity of discordant relationships between reduced and oxidized wares for the plotted surface sites, indicate that disturbed sherds from earlier levels are seldom present in sufficient quantity to upset the percentage frequencies of the cultural unit represented by an adequate surface sample.

More discussion of the significance of the "mean cultural date" is required. Ford (p. 51) concludes that this surface date does not reflect the length of occupation, the date of settlement, or the date of abandonment. One may question this conclusion, since available evidence suggests that the surface collection usually *does* reflect the period of terminal occupation. Ford checked the reliability of surface dates by test pitting all deep sites, and by collecting sherds from all parts of the site surface. "Generally it would not be expected that an older stratum would be covered for its full extent" (Ford, 1949, p. 35). Excavations were made in at least 28 sites (not counting those excavated by Bennett), but the datings assigned to both the surface sherds and the excavated levels have been published for only 9 of these sites. Ford used the data obtained from 10 of the excavated sites to make the master chart of Viru ceramic development, and 4 of these have both the surface and excavation dates given (Appendix A and Fig. 4). The terminal occupation is reflected by 3 of these surface collections (sites V-108, 272, and 171). The last of these sites is especially important because the large surface sample (626 sherds) matched the excavated percentages for the Estero (Inca) period almost perfectly. However, excavation in various parts of the site revealed an occupation throughout the *entire range of the Viru Valley chronology*, from Estero to Guañape.

The surface sample from site V-167 is the only collection which does not agree with the terminal occupation date indicated by excavation. The surface sherds were placed in late Gallinazo times (F-G Ford, Appendix A) but the fourteen levels from cut A at this site were compressed into 3 Tomaval (D-E) levels in Figure 4. The diagnostic ceramic types and frequencies are completely different for Gallinazo and Tomaval, yet Ford places the surface sherds in an earlier period than those found in the stratigraphic levels.

Ford gives surface and stratigraphic dates in Appendix A for 5 other excavated sites not included in his chart. The two dates are stated to agree for sites V-14, V-46, and V-127; V-39 has a Huancaco surface date, and a late Gallinazo stratigraphic date; sherds from all parts of V-89 indicated the Gallinazo period, though 47 sherds from an excavated room were placed in the Huancaco period.

Bennett (1950, pp. 24-63) discusses 21 Gallinazo sites but for only 5 sites have we both surface and excavation dates: all surface samples are placed in a Gallinazo-Huancaco transition period while all excavation dates are Gallinazo alone, with frequent extension into early Gallinazo. Five other sites have only surface dates given, and all are placed in the Gallinazo-Huancaco transition period. Again there is the suggestion that the surface dates are consistently later than the strata they cover.

Of the 14 sites for which both surface and stratigraphic dates are given by Ford and Bennett, all but one suggest that the "mean cultural date" reflects the terminal occupation of the site. This possibility should be checked for all sites from which both surface and excavated sherds were collected. Special attention should be paid to the depth of the site and, if the site was occupied for multiple periods,

to the quantity of out-of-place sherds. Insofar as the available information is representative, it can be asserted that surface sherds from any deep deposit will not reflect the average period of occupation of the site. Contrary to Ford's assumption, site V-171 and most of Bennett's sites indicate that earlier occupation deposits can be completely covered if the site is of any depth. Therefore, in using these surface dates in studies of settlement pattern and population growth, one must be careful not to overrate the significance of small, shallow sites (well represented in the survey) in relation to the concealed earlier occupation of large, deep sites.

THE SIZE OF THE SHERD SAMPLE

Another problem is the size of a surface sample to which a reliable date can be assigned. Ford (p. 36) concludes "that the range of variation from the actual percentage of a type on a site to be expected in a collection of over about 200 sherds is probably not more than 10 per cent," and the sites graphed in Figure 5 confirm this quantitative definition of reliability. However, in Appendix A Ford has dated collections which are too small to insure this approximation to actual type percentages; more than 20 per cent of the sites are represented by collections of less than 50 sherds.

Temporal placement of the Viru surface collections in a specific ceramic period depends on sherd number with each ceramic type expressed as a per cent. Most of the diagnostic decorated types represent less than one per cent of the total number of sherds in any sample of over 200 specimens (the importance of decorated sherds will be discussed presently). Therefore, in collections of less than 200 specimens, single sherds are accorded excessive per cent ratings which are not comparable to the same per cent figure representing numerous decorated sherds in a large surface collection. For example, the 3 Puerto Moorin W/R sherds from site V-193 (Fig. 4, J, 103 sherds) represent the maximum frequency of the type (3 per cent) and these few sherds are therefore considered diagnostic of the period frequency (Fig. 8). The 6 to 9 Puerto Moorin W/R sherds from sites V-74 (743 sherds) and V-16 (993 sherds) represent less than one per cent of the total surface sherds and so have no significance in the temporal placement of these sites (Fig. 5, F-G, late Gallinazo). The placement of a number of sites (such as V-134, 138, 215, 273, 298, 300) depends on the presence or, equally important, the absence of decorated wares, but too few sherds are available to ensure a representative range of types, let alone a significant percentage frequency. A large number of site collections with less than 100 sherds have been "dated" in Appendix A. Only 7 of the 51 post-Puerto Moorin sites rated as "poor" have over 200 sherds; it would appear that most of the collections with dates to which Ford has assigned a "poor validity" rating are not represented by a sufficient number of sherds to yield the original ceramic frequencies.

QUANTITATIVE FIRING PERIODS AND QUALITATIVE CERAMIC PERIODS

Repeated reference is made to the rarity of decorated wares in midden refuse; "obviously the already known ceramic chronology [of decorated wares] promised to be of little assistance in the dating of dwelling site refuse" (Ford, 1949, p. 41). The Viru classifiers therefore concentrated full attention on the utility wares and propose a variety of types on the basis of firing, finish, and size. Ford (p. 31) offers the final result as a study in quantitative method. His procedure represents one of the foremost advances in American archaeology and the over-all success of the detailed analysis of plain wares is quite evident. However, the author seems to have overstated his reliance on quantity rather than quality. Insofar as Figures 4 and 5 are represented, the ceramic periods proposed by the Viru project are still defined by the presence or absence of diagnostic decorated types. Many surface collections have been dated by these fancy time-bearers rather than by the quantity of plain wares found, even though the domestic pottery should be the best indication of the occupation period.

On the basis of a quantitative analysis of undecorated pottery, the history of the Viru Valley is represented by only three periods, characterized by differing firing techniques: uncontrolled (Guañape); oxidization (Puerto Moorin, Gallinazo, Huancaco), and reduction (Tomaval, La Plata, Estero). These three stages will be referred to hereafter as firing

periods. From Gallinazo times on, the finer ceramic subdivisions are set up primarily on the presence or absence of the rare decorated sherds in the midden. This becomes clear when the strata cuts plotted in Ford's Figure 4 are viewed independently; here it can be seen that most of the plain ware types maintain a relatively constant frequency at each site within the three firing periods. Only one site, V-171, covers the whole period of reduced firing (Tomaval to Estero). The only significant quantitative change is the shift from the earlier dominance of Castillo-Valle Plain (oxidized) to Tomaval-Viru Plain (reduced). This change is completed in the Tomaval period, and the later period distinctions depend on the presence or absence of the few Inca, Chimu, or Tiahuanacoid decorated sherds. Moche sherds and the absence of negative painted sherds are the diagnostic features which set the Huancaco period off from the Gallinazo period.

The specific placement of numerous sites in Ford's Figure 5 illustrates this reliance upon decorated wares. Site V-46 is placed in the La Plata period because of one or two La Plata Moulded sherds and the quantity of Viru Plain. However, the plain ware frequencies at this site are more compatible with the Tomaval period, where they match the expected frequencies better than those of site V-37, a site dated as Tomaval by Ford. Site V-247 is quantitatively Huancaco but is placed in the Gallinazo period because of the decorated sherds. Sites V-300 and V-287 have equivalent plain ware frequencies, but their different specific placement depends on the presence or absence of Huancaco Decorated sherds. On the basis of plain ware frequencies, there are grounds for shifting V-223 from the Tomaval to the La Plata period, V-139 from Huancaco to Tomaval, V-231 from middle to late Gallinazo, and V-293 from Gallinazo to Huancaco. Ford's placement of such sites as V-174, 300, 139, and 68 provides period frequencies of plain wares which can vary from 0 to 30 per cent from the frequency found in stratigraphic levels. The dating of sites on the basis of decorated sherds often places the associated plain wares out of context within the firing periods, and sometimes shifts the plain wares into a completely different firing period. Therefore, at a significant number of sites the claimed significance of the present plain ware frequencies has not been utilized.

THE TEMPORAL SIGNIFICANCE OF SIZE VARIATIONS IN PLAIN WARES

To Ford (p. 40) any " 'type' is an artificial concept created by the classifier." However, on page 67 he confuses his actual taxonomic procedure by stating that only certain of his typological divisions are "artificial distinctions" while others are "inherent in the material." In defining a type the classifier must select diagnostic traits from a wide variety of differences. He seeks to control this arbitrary choice by selecting those variations which have some value for predicting cultural associations in time or area. When dealing with quantities of sherds he must be careful not to overrate the significance of frequencies which can be unduly influenced by preservation, intended use, or original vessel size. The importance which Ford has placed on size variations in plain wares needs clarification. The only difference between Castillo Plain and Valle Plain is that of thickness, the division being between 6 to 12 and 12 to 40 mm., respectively (Ford, pp. 74, 75). Just the mechanical task of training the eye to judge this nonequal size variation between the two types would produce an appreciable error, which is noted by Ford on page 47. Additional questions concerning the value of this size distinction arise from the plotted frequencies. The maximum average frequency of Valle Plain in the excavated cuts is 25 per cent, with a contemporaneous 65 per cent for Castillo Plain. Usually larger vessels make more sherds than smaller ones, but such is not true of the two types under discussion. As drawn in Ford's Figure 6, Valle vessels are approximately *twice as large* as Castillo vessels, yet there are less than one-half as many Valle sherds. Therefore, only a few Valle vessels need be represented by this small number of sherds, and there is the possibility that a single vessel, if relatively unscattered, could radically alter the frequency relationship between Valle and Castillo. In addition, the rim sherd frequencies, as plotted in Figure 6, suggest that the number of Valle and Castillo vessels was more nearly equal than the number of sherds or the average sizes would indicate. The size and shapes of rim sherds often provide a general indication of the number of vessels, and a discussion of the relative quantities of rim and body sherds of these two size variants would be useful in the final description of these ceramic types, if the size distinction is

retained. It is also possible that rim, neck, and shoulder portions of these plain vessels were thickened for strengthening, while the remaining body of the pots was gradually thinned toward the bottom. Sherds from the same vessel could easily be placed in different types.

Ford nonetheless feels that the typological distinction is justified because he finds "that Valle Plain came in later than Castillo Plain and reached a lower peak of popularity is shown by all cuts that cover the early part of the Gallinazo period" (Ford, p. 48). When the pertinent levels are plotted individually, the fluctuation between Valle and Castillo types does not support temporal significance. Both cut 1 and cut 2 of site V-51, and cut 2 of site V-162 do show minimal percentages of Valle in the lower levels, but so does cut 1 of V-162 which is placed in mid-Gallinazo, at the peak of the Valle frequency in the other cuts! In addition, both cuts at V-51 show a double curve frequency of the Valle Plain type rather than the normal curve, with the frequency of the upper middle levels approximating the original minimal frequency. If the two ceramic types are valid, a rearrangement of the contemporaneous placement of the four Gallinazo cuts is indicated. The placement of surface sites in Figure 5 has no demonstrable relationship with the frequency of Valle Plain. The purpose of dividing the Valle and Castillo types was to provide an additional temporal determinant. This purpose has not been fulfilled because the 20 to 30 per cent fluctuation in both Figure 4 and Figure 5 destroys any diagnostic frequency of Valle Plain—levels and sites with 1 per cent frequency are interdigitated side by side with those yielding 35 per cent of these sherds. Sites with early Gallinazo Valle frequency are placed in middle Gallinazo, and vice versa. The contrast between the 11.5 per cent Valle frequency of Bennett's (1950, p. 71) Gallinazo I and Ford's 3 per cent frequency of early Gallinazo provides an additional reason for questioning the distinction made between Valle and Castillo Plain sherds as now defined. The uniformity needed for diagnostic temporal significance can be achieved by the combining of Valle and Castillo into one oxidized plain ware type, as shown in Figure 79, herein.

The same problem is raised by the two reduced plain ware types in the post-Gallinazo period, Tomaval and Viru Plain. A similar fluctuation in frequency as discussed for the oxidized plain wares is obvious in Figure 5. As drawn in Figure 6, the Viru Plain vessels are approximately three times as large as Tomaval vessels, yet the frequency of sherds is the reverse, Tomaval being three times as plentiful as Viru sherds at the peak of popularity. As with the oxidized wares, this is not reflected in the rim sherd frequency plotted in Figure 6.[3] Since the frequencies of Viru and Tomaval Plain show the same trend from late Gallinazo times on, there is little temporal significance to be gained by the division of the single ware.

A SUGGESTED REVISION IN SURFACE DATINGS

The quantitative changes of the commonest plain wares do become meaningful in a temporal sense if the size distinctions are not made. When the Viru and Tomaval Plain types are represented as a single reduced ware, and Valle and Castillo Plain are graphed as one oxidized ware, the post-Puerto Moorin surface sites in Ford's Figure 5 can be arranged so as to reflect the gradual transition from one firing period to the other, as done in Figure 79. Only half of the Gallinazo and Huancaco sites given by Ford (Fig. 5) could be plotted as strip graphs in the space available, but the relative position of the remaining sites has been indicated by the site number. With one exception (V-179), all sites have been placed on the basis of quantity and the theory of normal distribution, with no reference to decorated wares. In order to obtain a sufficient number of sites which could be plotted, the minimal number of sherds per sample was reduced to 130; the 9 sites with fewer sherds were not used. Collections of less than 200 sherds produce occasional irregularities in the frequency curves, but the greatest variability results from sherd samples with a large unclassified residue. Sites with such collections have been included

[3] When viewing the excessive quantities of Castillo Plain and the virtual absence of Rubia Plain in the post-Gallinazo period as plotted in Figure 5, with the opposite frequencies in the excavated cuts (Fig. 4), one wonders about the practicality of separating these two late oxidized plain wares.

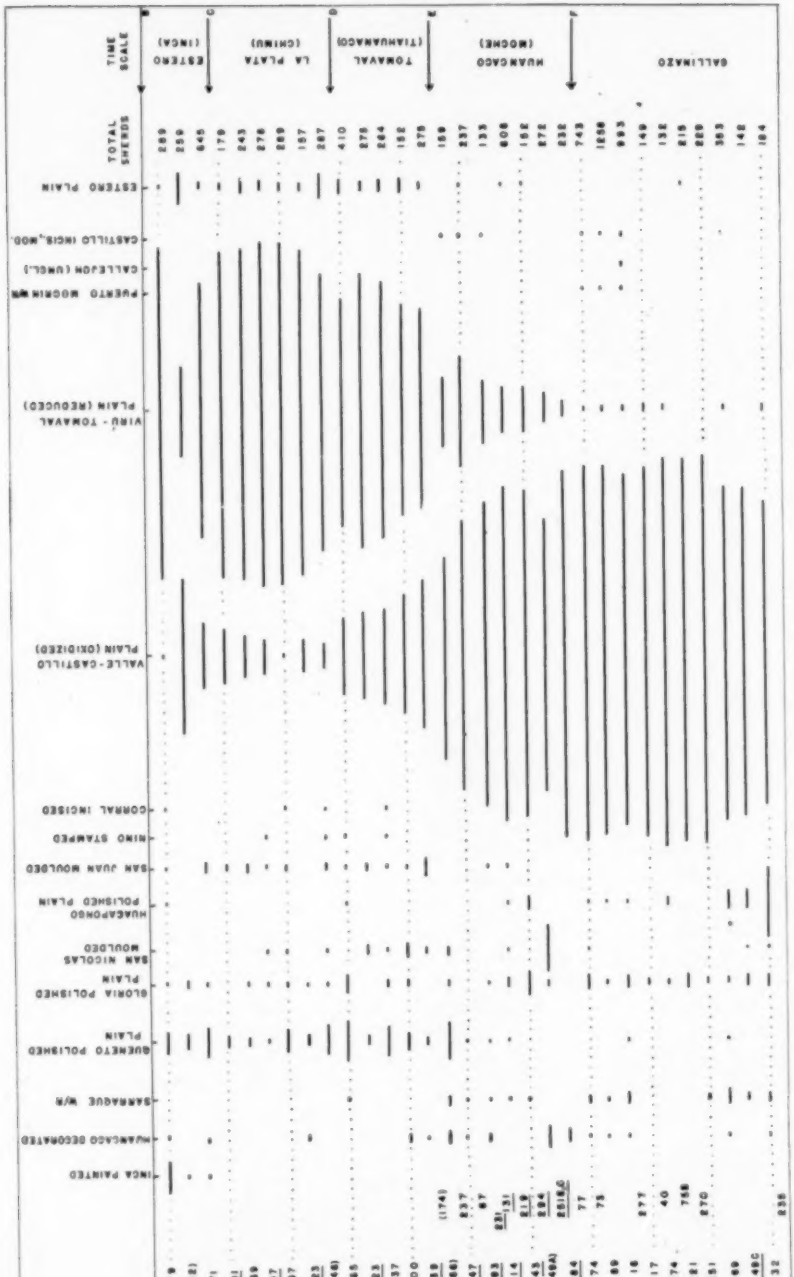

FIG. 79. Viru ceramic history as shown by surface collections. Revision of Ford, 1949, Fig. 5.

in parentheses in Figure 79. No attempt has been made to indicate the relative time duration of the periods in Figure 79, herein.

Of the 46 surface collections used, the 16 underlined sites in Figure 79, have been placed in a different ceramic period from that assigned by Ford. Many of these newly placed sites are rated as excellent fits by Ford, so the dating of many nongraphed collections given in Appendix A is also open to question.

To some, this 35 per cent difference in the placement of sites between Ford's Figure 5 and Figure 79, herein, may seem a slight margin of error in terms of the over-all project of surface dating. However, the rearrangement does satisfy the theoretical principle of quantitative analysis better than Ford's seriation. Certain other problems are clarified by the rearrangement. Site V-251 was excavated in meter levels and strip graphs were made for the small number of sherds found. Ford seriated these so as to place the top level [Fig. 5, V-251 (676), *G-H*] *below* the second level [Fig. 5, V-251 (648), *F-G*]. Such reversed stratigraphy would be unusual, and one may question the placement of the levels even if no typological change is made. When the plain wares are combined, both levels occur together (Fig. 79, *E-F*[4]). Another problem is the rarity of collections representing the La Plata and Estero periods. Urbanization is the main explanatory factor suggested by Ford, but is inadequate to account for the drop from approximately 66 Tomaval sites to 18 La Plata and 6 Estero sites. In the rearrangement suggested in Figure 79, herein, the number of La Plata sites has been doubled, and it seems likely that if domestic pottery is given preference over the few decorated sherds a greater number of the Tomaval collections in Appendix A should also be placed in the later periods.

As the sites are arranged in Ford's Figure 5, the quantity of oxidized ware in the Estero period is completely out of proportion to the expected frequency. When the four major plain ware types are combined, and the sites arranged on a purely quantitative basis, as done in Figure 79, there is the suggestion that the Viru Valley pottery makers were again shifting to oxidized firing. The only indication of this in the excavated sites is the decreasing frequency of the reduced wares. The typological distinction between the two late oxidized wares, Castillo and Rubia Plain, may be a complicating factor and should be defined more fully. Two Inca sites, V-179 and V-112, exemplify the problem, and indicate the importance of valid ceramic types. If the typological size distinction does have temporal significance, as proposed by Ford, site V-179 does yield sherd frequencies which are diagnostic of the Estero period (though the Viru type is still excessive), and no shift to oxidized firing would be indicated. However, the collection from site V-112 then would quantitatively typify the Tomaval period, and the site may have been reoccupied for a short time in the Estero period. If the plain ware size variants are combined, site V-112 becomes a typical Inca site, but site V-179 would have La Plata Plain ware frequencies.

Ford (p. 52) suggests that the out-of-place occurrence of late types like San Nicolas Moulded in Gallinazo surface sites is due to disturbed cemeteries. However, many of these site collections have excessive reduced plain ware frequencies (sites V-114, 131, 219, 247, 294) and on a quantitative basis should be placed in a redefined Huancaco period.

REVIEW OF PERIODS AND RELATIONSHIPS

GUAÑAPE

Numerous other problems exist with regard to certain ceramic periods defined by stratigraphic excavations, and can best be discussed in chronological order. Ford, by his use of early, middle, and late divisions of the Guañape period, implies a single culture divided into three approximately equal temporal divisions. Actually, as pointed out by Rowe (1950, p. 171), early Guañape ceramics as now defined are quite different from those of middle and late Guañape, corresponding rather to the first Early Farmer pottery described by Bird (p. 26; also Bennett and Bird, p. 121), and deserve cultural recognition. The time period M-N in Figure 4 should be extended upward to include the end of the two ribbed types. L-M Guañape ("middle") would then be marked by the introduction of the bottle vessel, stirrup spout, and a variety of decorated

[4] The site is one of a group which quantitatively is Huancaco, though no Moche decorated sherds are represented. This problem will be discussed later in connection with the Moche influence in Viru.

types, all of which are supposedly comparable to the Cupisnique culture of the Chicama Valley. This change is quite as significant as the appearance of Huancaco sherds, and in both situations it should be noted that plain ware frequencies are not materially affected.

The use of Ancon as a type name for Viru sherds implies an identity, but one not readily discernible, between the descriptions given by Ford (pp. 77-78) and the early Ancon type collection in the University of California Museum of Anthropology (Strong, 1925, pp. 152-156). The distinctive quality of the commonest Guañape decorated type, "Ancon Fine Line Incised," is the lack of polish. The available description is inadequate to identify the type in Ancon sherds in the University of California Museum of Anthropology, a characteristic of which is their high polish and groove incising. The stirrup spouted vessel is a characteristic form of "Ancon Polished Black." No evidence of the stirrup spout is to be found at Ancon in the Uhle surface collections or the grave wares illustrated by Carrion (1948, pl. 25). Strong and Willey (1943, p. 16) refer to only one fragment from the single stratigraphic test pit made in the Ancon site. The "Ancon Zoned Punctate" consists of angular depressions, and differs from the dull punctate of early Ancon. Three Cupisnique pots are illustrated by Ford in Figure 9 which lack Guañape counterparts in Figure 4 or in the type descriptions: Applique Nodes, modeled vessel, and "Ancon Zoned Red."

PUERTO MOORIN

Perhaps the most serious problem is the Puerto Moorin period; its existence is doubtful. Available information does not support the current definition of a culture dominated by white-on-red ceramics isolated in time between the Guañape and Gallinazo periods because:

1. No white-on-red ceramic period was isolated stratigraphically in the Viru Valley. All pertinent excavations yielded transitional levels in which Guañape sherds were mixed with Gallinazo sherds, with no evidence of white-on-red ceramics.

2. Surface collections assigned to this period lack adequate sherd samples, do not fulfill the expected type frequencies, and often contain sherds of later ceramic periods.

3. The period is represented stratigraphically by a single ceramic type, Huacapongo Polished Plain. This type appears to be an artificial creation containing both a polished and a plain ware.

The stratigraphic placement of Puerto Moorin rests on one excavation, at site V-272, cut B (Ford, 1949, p. 46, Fig. 4). This cut had 8 levels. In the top 2, Gallinazo and Guañape sherds were mixed, and these levels were not used in the stratigraphic analysis. The lower 6 are stated to be "unmixed" (p. 46), meaning that Gallinazo sherds were not present in quantity. Unstated in the text, but illustrated in Figure 4, is the fact that Guañape sherds are *mixed throughout* cut B with Huacapongo Polished Plain, the diagnostic Puerto Moorin ceramic type. Only the 2 lowest levels of this cut lack any Gallinazo sherds.

In addition to site V-272, one other site had Guañape sherds mixed with Gallinazo sherds: site V-171, cut C (pp. 45-46). Of the 12 levels, the lowest 7 had some Guañape Red sherds mixed with preponderant Gallinazo sherds, and since "inclusion of these levels in the master graph would give a misleading idea of the relation of these types" the 7 levels were ignored. The same selection is suggested for site V-302, cut A (p. 47): time span from Moche to Guañape, but thrown out because of "mixing of older and later types in the same levels."

Bennett (1950, p. 73), working independently but accepting the Viru framework without question, mentions a similar situation in which 4 Guañape types were found in the lowest level of an unstated number of Gallinazo sites.

There is no argument with the interpretation of levels as mixed when the ceramic types found together in these sites occur in different strata in deep deposits. However, it is quite a different procedure to disregard the only available stratigraphic data and construct a hypothetical stage to fit preconceived theories, in this case the suggested existence of a distinct time period dominated by white-on-red ceramics. The only interpretation possible at present from the excavations is that late Guañape and Puerto Moorin plain wares were contemporaneous in the Viru Valley, both plain wares dying out in the Gallinazo period.

The only stratigraphic occurrence of the only other Puerto Moorin ceramic type, Puerto Moorin White-on-red, is a rare continuous

distribution throughout the Gallinazo period, at 2 sites (Bennett, 1950, p. 84, found the few sherds of this type only in Gallinazo I). The type does not occur at site V-272, the only excavated Puerto Moorin site with published data. It is therefore a pure construct to associate this decorated ware with the Puerto Moorin period—stratigraphically it is a Gallinazo ware, contemporaneous with negative painting. The frequency of this type has been misrepresented in the text. The maximum frequency of 3 per cent (Ford, 1949, p. 59) is found only at *one surface site*, V-193 (Fig. 4), and this percentage amounts to approximately 3 of the 103 sherds collected. Doubt has already been expressed as to whether 100 sherds is an adequate sample for surface dating. Of the 26 other Puerto Moorin sites graphed in Figures 4 and 5, only 3 yielded one or two White-on-red sherds (3 late Gallinazo surface sites also yielded W/R sherds; Fig. 79). Stratigraphically, in the Gallinazo period, the type frequency of Puerto Moorin W/R never exceeds one per cent of the sherd sample.

Presumably the stratigraphic evidence available on the Viru sequence was disregarded because of certain mortuary wares (to be discussed presently) and because of the large number of surface sites yielding little else but Huacapongo Polished Plain pottery. In order to block in the Puerto Moorin period graphically, Ford, in his Figure 4, interdigitated 18 of the sixty-odd possible J-K surface collections listed in Appendix A. In contrast, only 7 surface collections fitted the conception of late Puerto Moorin, and none of them provided the proper percentages needed to fill in the I-J gap in Figure 4. Less than half of these surface collections represent more than 100 sherds; many of the houses yielded less than 20 sherds. All but 11 of the sixty-odd Puerto Moorin sites yielded sherds of post-Gallinazo ceramic periods, and, in view of the small number of sherds, it is possible that the "split occupation" of these sites (Ford, 1949, p. 50) is a typological construction. Such use of surface material is extremely hazardous without stratigraphic support, and the whole period becomes dependent on the validity of the Huacapongo ceramic type.

Again, it is doubtful whether Huacapongo Polished Plain is a valid type. In addition to being "harder than other Viru pottery," the "distinguishing traits of Huacapongo are the scraped interior surface and the scraped and *polished* exterior" (Ford, 1949, p. 76, italics mine). Yet on the same page it is stated that the type Guañape Red Plain is "ancestral to Huacapongo Polished Plain. *The division between these two types is purely arbitrary.* For pottery made during the period of 'transition,' the assignment of sherds to one type or the other is difficult" (italics mine). Since the period of "transition" is represented by the entire depth of site V-272, and by half of the 18 surface sites used in Figure 4, the distinction between the Guañape and Huacapongo wares is slight indeed.

Since Castillo Plain develops out of Huacapongo Polished (p. 63), one can assume the same difficulty in typing sherds is involved in transitional Puerto Moorin-Gallinazo wares. As graphed, Castillo Plain reaches its constant maximum popularity before the end of the Puerto Moorin period, and the whole of late Puerto Moorin can be considered the period of transition in which the distinction between Castillo Plain and Huacapongo Polished is purely arbitrary. This situation clearly bothered the Viru classifiers because it serves as the type example in the discussion of their theory of typology: "One type concept might have been established on the basis of this border material that now appears to be between Guañape and Huacapongo, and another on the present border material between Huacapongo and Castillo Plain. If that had been done, then the material that is now considered typical Huacapongo would be on the border between the two new types" (p. 41). Again, on page 67 one reads: "The transition from type Castillo Plain to Tomaval Plain is not comparable with that from Huacapongo Polished Plain to Castillo, or from Guañape Plain to Huacapongo. In the latter cases, the division was *clearly made by the classifier*, and the artificial distinction between the types required considerable care to achieve consistency. The divisions between Castillo Plain-Tomaval Plain . . . are much sharper and are inherent in the material" (italics mine). In the distinction between the wares under discussion the very specific technique of polishing is "inherent in the material" also, and it is therefore difficult to understand why there should be such difficulty in classifying plain versus polished sherds.

Bennett (1950, p. 73) notes a few fragments of four types of Guañape sherds in the lowest levels of his Gallinazo sites; Puerto Moorin was not represented stratigraphically. The maximum percentage of Huacapongo Polished Plain was 1.8 per cent, and the type was restricted to Gallinazo I. This is in sharp contrast to the 12 per cent Huacapongo frequency of Ford for early Gallinazo. Has Bennett, working on the assumption that only the Gallinazo period was represented, provided the actual frequency of Huacapongo *Polished* Plain in the transition between Guañape and Gallinazo?

There is again the suggestion that the desire for a specific white-on-red period has influenced the classifiers, and that the present Huacapongo type is actually a composite of polished and plain wares. It may be noted that in all earlier and later Viru periods the polished wares are in a definite minority in comparison to the plain wares. Puerto Moorin would be a unique period and culture in that all pottery made was of a single polished type. Ford (p. 48) calls attention to the abnormally fast rate of change indicated for Huacapongo as plotted in Figure 4, though he suggests that not enough time has been allowed for the period. An alternative suggestion, supported by the rarity of surface sites which fulfill the expected late Puerto Moorin ceramic frequency, might be that the period is a typological construction, since stratigraphic evidence from at least two unplotted sites indicates the direct transition from Guañape to Gallinazo. Perhaps more likely is a short period characterized by polished red decorated pottery during which the plain ware development was not affected. The Huancaco period is a later example of this situation. The publication of the so-called "mixed" levels in the discarded cuts, with reclassified ceramic types, would probably provide the actual percentages demonstrating the cultural change which followed the Guañape period.

Puerto Moorin Relationships

It would appear that the main factor responsible for the creation of the Puerto Moorin period is the Salinar culture defined by Larco (1944, 1945a), currently placed between Cupisnique and Moche I in the Chicama Valley. Unfortunately, in the series of publications by Larco on the north coast of Peru, the Salinar and Viru cultures have become confused. In 1941, Viru Valley vessels were labeled "Viru-Cupisnicoid" (Larco, 1941, Figs. 43, 80). In later publications Larco (1944, p. 1; 1946b, p. 155) refers to one "Salinar" cemetery and one "Salinar-Cupisnique" cemetery in the Viru Valley. Strong (1948, p. 99) identifies the typical Salinar cemetery as site V-66, "the best evidences for an isolated Salinar period." Larco has assumed an exact synonymy with the Chicama culture, and none of the vessels are identified as to provenience. Those Viru vessels which Larco illustrated in 1941 provide several distinct types which can be segregated from Chicama vessels. The modeled specimens represent poorly executed humans atop a larger vessel body, connected to a spout and bridge (Larco, 1941, Fig. 43, Nos. 1, 2; Fig. 80). Similar "Salinar" specimens are shown by Larco (1944, p. 4 bottom, all of p. 5, p. 9 bottom; 1946b, Pl. 66d), and Strong (1947, Pl. VII, bottom). The spout and bridge type is characteristic of the Viru Valley in the Gallinazo, Huancaco, and Tomaval periods, and was never frequent in the Chicama Valley. In contrast, the Chicama Valley specimens illustrated by Larco as Salinar (1941, Fig. 328) are typical of a different style of modeling which includes better proportions, larger size, an emphasis on whole figures, and handled-bottle, or stirrup spout vessel forms. "Fitomorphic" spout and bridge vessels are another Viru-Cupisnicoid form (Larco, 1941, Fig. 80, left column, 2nd down) later illustrated as "Salinar" (Larco, 1944, p. 11, top). Multibodied vessels (Larco, 1941, Fig. 43, right, and Fig. 80) also may be a Viru specialty lumped with the Chicama Salinar (Larco, 1948, p. 21, No. 4). Multibodied vessels are characteristic of the Gallinazo culture in the Viru Valley.

The problem is still further confused by Larco's latest publication (1948, pp. 20, 22) in which there is no mention of the Salinar culture in the Viru Valley, but the contemporaneity of Salinar with the negative "Viru culture" is proposed, and the superposition of these negative graves over Cupisnique graves in the Chicama Valley is referred to (Larco, 1948, p. 22). Strong (1948, p. 99) states that Bird has also found ceramics similar to those of Gallinazo in the northern valley.

The possible contemporaneity of the white-on-red and negative horizon styles is also suggested in the Chancay Valley. Willey's (1951,

pp. 113, 114) defense of a pre-Interlocking existence of the white-on-red style at Cerro de Trinidad seems justified. However, a pre-negative occurrence of this decorative technique is purely a matter of interpretation. The negative horizon is represented at this site by only *six sherds* (Willey, 1943, Tables 7, 8). Of these, four sherds occur in pit IV, in level 9 of pre-Interlocking levels 8 to 11; in pit VII one sherd occurred in level 13, and one in level 19 of levels 9 to 20. Ford (1949, Fig. 8) emphasizes the four sherds and considers the Chancay W/R period to be pre-negative. With so few sherds no definite conclusion is possible, but it is just as logical to emphasize the distribution of these sherds, and claim a contemporaneity of negative painting with white-on-red in the Chancay Valley. Ford (pp. 60, 63) postulates that the idea of white-on-red decoration came to Viru from this central valley, and, as the Puerto Moorin W/R type, replaced the Guañape incised complex. There is no stratigraphic support for this postulation in the Viru Valley. Chancay White Decorated (similar to Puerto Moorin W/R), Chancay White Slipped (similar to the Gallinazo Sarraque W/R), and the mammiform jar (a characteristic Chancay form) are all contemporaneous in the Chancay Valley. Both Sarraque W/R and the mammiform jar appear for the first time in the Viru Valley in the Gallinazo period, and there is no evidence at the present time for the prior appearance of Puerto Moorin W/R. Bennett (1950, p. 106) actually proposes that the Chancay W/R period "presumably corresponds closely in time to Gallinazo II."

GALLINAZO

The ceramic chronology presented by Ford in Figure 4 has been proposed as a master graph which can be used to establish the temporal position not only of the artifacts recovered from excavation, but of any adequate surface sherd sample from the Viru Valley. It has been so used by Bennett (1950) and by Ford (1949, Appendix A, condensed in Fig. 5). It is offered as a foundation for the study of the prehistoric settlement pattern of the valley to be made by Willey. It is therefore essential that such an important graph be checked as carefully as possible to insure its correctness before too many studies become dependent on it.

Bennett seems to have accepted the master chart without attempting to check the Gallinazo percentages. His Figure 17 is an "adaptation" of Ford's Figure 4, but is of uncertain value because of definite variations stated in the text. The following tabulation provides examples of the different frequencies obtained by Bennett (1950, text, p. 71) and Ford (1949, graph, Fig. 4):

	GALLINAZO I		GALLINAZO III	
	Bennett	Ford	Bennett	Ford
Castillo Plain	60	70	40	58
Valle Plain	11.5	3	31	26
Tomaval Plain	6.5	2	8.3	8
Gloria Polished	11	5	11	4
Sarraque Cream	4.5	5	4.5	1–

The most extreme variant is Huacapongo Polished, with Bennett (1950, p. 73) finding the type only in Gallinazo I with a *maximum* of 1.8 per cent; Ford (Fig. 4) found the type equalled *12 per cent* of the total sherds in average early Gallinazo levels with a gradual decrease to disappearance in late Gallinazo.

The variation is such that the best fit of the percentages recorded by Bennett for Gallinazo I is the middle Gallinazo (G-H) of Ford's Figure 4. However, the construction analysis and the association of Guañape sherds suggests that Bennett did obtain early Gallinazo.

Most of Bennett's samples were from floor levels and rooms and so are not directly comparable with the equal stratigraphic levels plotted by Ford. Therefore, a detailed study of Figure 4 itself was attempted. Each stratigraphic cut was traced separately as a unilateral graph, and the levels were matched independently. The frequency fluctuation in many of the ceramic types suggests that specific percentages are not as significant as the trends indicated and the variety of types present. A variant arrangement of the four Gallinazo cuts which seems to have as much validity as that published by Ford is shown in Figure 80.[5] Since the actual number of sherds recovered from each level is not available, Figure 80

[5] In general, only alternate levels could be shown in the space available. Level 225 of site V-162, cut 1, has less than 80 per cent of the sherds represented in Figure 4, and level 250 was therefore substituted. It was necessary to enlarge slightly percentages of one per cent or less in Figure 80, herein, because of the size reduction of the graph.

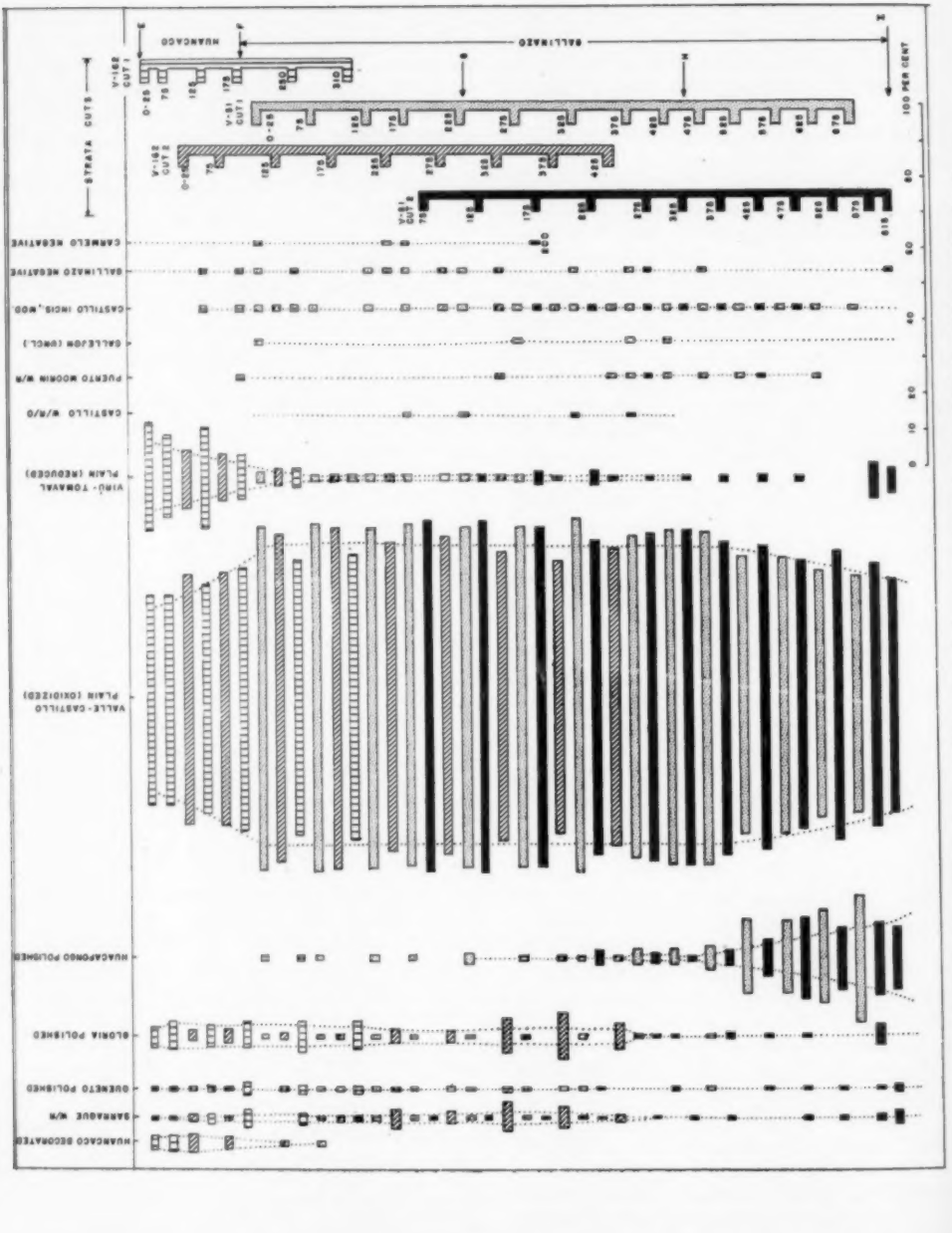

FIG. 80. Stratigraphic seriation of Gallinazo and Huancaco excavated levels. Revision of Ford, 1949, FIG. 4.

represents only an approximation, and is offered only to show that the master chart presented by Ford needs additional checking.

Using the evidence available in Ford's Figure 4, the following defense of the new arrangement is presented:

1. The major quantitative change in Viru ceramic history is the alternation between firing techniques, expressed most clearly in the plain wares. Until information to the contrary is presented, the bulk of the stratigraphic evidence indicates a transition directly from the Guañape plain wares (uncontrolled firing) to those of the Gallinazo (oxidized) period. The relatively smaller per cent of Valle-Castillo and the excessive Tomaval Plain (actually some sherds may represent Guañape Black Plain) of the first levels of cut 2, site V-51, are more in agreement in the new chart, representing the transition in firing techniques. For the lower levels of cut 1, site V-51, the Castillo frequency is excessive for late Puerto Moorin and there is no Tomaval, conditions which are more meaningful if the relative position of the two cuts is reversed.

2. As noted before, the relation between Valle and Castillo Plain has little meaning because of the excessive fluctuation in frequency between adjacent levels and the two types have been combined in Figure 80. Valle Plain seems to have been the main determinant in Ford's placement of cut 2, site V-162, but his arrangement of levels throws the Huacapongo, Gloria, and Sarraque frequencies out of relationship to the other V-162 cut, and also to site V-51.

3. The Huacapongo frequency cannot be analyzed because of the probable confused identity of the type with Castillo Plain. In Figure 4 the placement of cut 2, site V-162, is completely discordant. Virtually no Huacapongo is present, while the Gloria Polished frequency is at its maximum—the reverse of the conditions found in the lower levels of site V-51. The V-162 conditions are similar in both cuts of that site, and the rearrangement of levels in Figure 80 produces a more satisfactory alignment. The new arrangement indicates the increasing frequency of Gloria Polished as the Huacapongo Polished type diminishes. This replacement is not definite within any single cut and the possibility that these two types are actually one should be investigated. It is odd that Bennett (1950, p. 100) states that Polished Red ware is first introduced in Gallinazo II (Figure 80, herein, would be in agreement as regards height of popularity), while on page 71 he indicates that the Gallinazo I frequency of Gloria Polished Plain is 11 per cent!

4. Sarraque W/R represents the same situation in which Ford has destroyed the uniformity of site V-162, and seeks an early climax of the type when a middle climax places more of the types in better alignment. Again the influence of the concept of an earlier white-on-red horizon is probably represented by the placement of this type in Ford's Figure 4. Bennett (1950, p. 71) found the maximum frequency of this type, as given by Ford, present in all periods.

The other types are too rare to have any definite temporal significance within the Gallinazo period. It may be noted that Bennett (1950, p. 84) found Carmelo Negative only in Gallinazo III levels while Ford, by his placement of cuts, extends the occurrence of this type almost into Gallinazo I. The new arrangement of cuts presented herein unifies the type in late Gallinazo II and III. The late emphasis on Gallinazo Negative agrees with Bennett's findings but Castillo W/R/O sherds were scattered through the middle levels of only one cut, and remain centered in middle Gallinazo. The Huancaco Decorated type is unified in Figure 80, herein, while Ford's arrangement of cuts introduces a break in this uniform type in late Gallinazo.

The trisection of the Gallinazo period has little significance at present. Few surface collections can be found which fulfill the definition of early and middle Gallinazo. The fine construction analysis presented by Bennett (1950, pp. 64-69) would allow a fourfold division, since Gallinazo III has two adobe types, "cane and plain adobes, the latter consistently more recent" in 7 excavations. The ceramic analyses presented to date leave much to be desired. Ford presents a very uniform period in which the only significant changes are in frequency, and some of these have been questioned. From his burial analysis, Bennett proposes a number of differences definitive of "initial" and "terminal" Gallinazo III which seem reliable because of the association of construction remains. There is thus a defin-

Fig. 80. Stratigraphic seriation of Gallinazo and Huancaco excavated levels. Revision of Ford, 1949, Fig. 4.

able basis in both architecture and ceramics for splitting Gallinazo III into two subperiods having diagnostic differences. On the other hand, Gallinazo II ceramics can be recognized only through strip matching (Bennett, 1950, p. 88). The grave lot information would have been much more useful if the undecorated pottery had been identified as to type of ware. Most of Bennett's conclusions about the earlier Gallinazo burials depend on the assumption that all graves from a site represent a single unit (Bennett, 1950, p. 97), an assumption which would not be valid at some Peruvian sites.

There is little evidence to support the Gallinazo I placement of the graves from sites V-154 and V-265. The seated flexed burial position is characteristic of Gallinazo III (Bennett, 1950, p. 108), and the Tiahuanacoid "Decadent Viru" (Larco, 1945b, p. 28; 1946a, p. 222). The face collar jar is considered a Moche introduction in Gallinazo III (Bennett, 1950, p. 117), though this origin is open to question, and the form is found in Gallinazo II. The open bowl with annular base (Bennett, 1950, Pl. 7G), among those cultures having possible relationships, is found only in the Recuay culture, and "becomes popular in periods following Gallinazo" (Bennett, 1950, p. 109). In assigning a Gallinazo I date to site V-265, Bennett seems to have favored the association of the Puerto Moorin W/R vessel. Ford found this decorated type throughout the Gallinazo period. Thus there is more evidence for a Gallinazo III placement of these graves than for Gallinazo I.

Bennett (1950, p. 100) proposes the introduction of "polished red ware" in Gallinazo II times, though substantial quantities of Gloria Polished Plain are found in Gallinazo I middens (Ibid., p. 71); Ford places the maximum occurrence of this type in early Gallinazo. Bennett (1950, pp. 117, 118) states that Gallinazo III witnessed the introduction of the face collar jar, double jar with little modeled heads under roofs, and a greater emphasis on modeling. However, all of these traits are found at the Gallinazo II type site, V-164. Bennett (1950, p. 100) considers polished black ware to be a new introduction in "terminal" Gallinazo III, though the type occurs in slight quantities in the middens throughout the Gallinazo period. Until the stratigraphic evidence is clarified, it will be extremely difficult to place Gallinazo graves having only a few vessels within the threefold division now proposed. As illustrated, the major ceramic differences are between individual graves within the Gallinazo subperiods rather than between these subperiods. The possibility of social class differences rather than temporal significance is suggested at present.

Bennett (1950, p. 118) suggests that Larco's Viru Auge is equivalent to terminal Gallinazo III, a time when "the Gallinazo culture center seems to have shifted to the upper part of the valley." It is impossible to evaluate the "Viru culture" properly from the summary descriptions available, but Larco (1945b, p. 1; 1948, pp. 20, 22) implies a synonymy of the terms "Viru" and "Viru Auge," claims a contemporaneity of Viru with Salinar in both the Viru and Chicama valleys until Moche I, and implies the continuance of the Viru pattern in the Viru Valley until conquest by Moche IV (Larco, 1948, p. 33). There is no indication that Larco seeks to limit Viru Auge to the Tomaval site; 13 cemeteries were excavated, in all parts of the valley (Larco, 1945b, p. 3; 1946a, p. 209), and an adequate sample of the whole Gallinazo period was probably obtained. If all vessels from site V-164 (Bennett, 1950, Pls. 8, 9) are correctly assigned to Gallinazo II, there is no reason why certain specimens illustrated by Larco cannot be placed in this middle Gallinazo period (e.g., Larco, 1945b, p. 5, upper left; all of p. 8; p. 18, upper left). Other of Larco's vessels could be placed in both Bennett's initial and terminal Gallinazo III, but grave lots and site provenience are needed to make such assignments meaningful.

Gallinazo and Callejon Relationships

Crucial problems in any analysis of Gallinazo culture are the foreign influences which apparently had a marked effect on the Viru Valley development. At present two main centers are indicated, one to the south in the Highland Callejon area, and another to the north in the Chicama and Moche valleys. Bennett (1950, p. 115) suggests a possible origin for Gallinazo in the Callejon, but emphasizes marked Recuay influence only in Gallinazo III. Stratigraphically (Ford, Fig. 4), the Callejon Unclassified type is found only at one site, V-51, where rare sherds were scattered from early to late Gallinazo, with a concentration in middle Gallinazo. Bennett (1939, p. 73;

1950, pp. 108-12, 118) and Kroeber (1944, p. 63) note some sixteen traits which are shared between the Callejon area and Gallinazo I, II and/or III. The number and the temporal distribution of these similarities implies just such a long, continuous contact with the southern center as is suggested by the midden deposit. The middle Gallinazo concentration of Callejon sherds could support the Gallinazo II placement of the relatively elaborate ceramics of site V-164. The greater frequency of contact suggested by the specific Gallinazo III traits is not adequately represented in the middens. Despite the proximity of the Chicama center, specific influences from the north were later and restricted primarily to a unified time period. Quite possibly the Gallinazo culture served as the agent for the introduction of Callejon elements, such as the "Recuay cat" and stone lined tomb into the Moche culture.

GALLINAZO AND HUANCACO PERIODS

These suggested Gallinazo influences on Moche do not agree with the Viru-Chicama relationships proposed by Ford (p. 66), who suggests the contemporaneous development of the Gallinazo and Moche cultures. Larco (1948) has since divided the Moche development into five subperiods, which have been corroborated by Rowe (Ms.) in his study of Uhle's grave lots from site F in the Moche Valley. No specimens identifiable as Moche V were present in the University of California Museum of Anthropology collections, but the other subperiods could be isolated in individual graves. Burials transitional between two successive stages contained vessels of both periods.

Ford's statement on Viru-Chicama relationships now would imply the contemporaneity of Gallinazo I, II, and III with Moche I, II, and III, respectively, with the Huancaco period representing Moche IV dominance of the Viru Valley. A number of factors suggest otherwise. There are the "Viru" remains in the Chicama Valley which Larco (1948, p. 22) places as coexistent with the Salinar culture. No vessels are illustrated to demonstrate the equivalence of these Chicama artifacts with the Gallinazo culture, but negative decoration is a diagnostic element. "Viru" burials have been found above, and intrusive into, Cupisnique burials (Larco, 1945b, p. 17). The only stratigraphic information on Salinar is the same post-Cupisnique and pre-Moche position. Moche ceramics display influences derived from both Salinar and "Viru," yet only Moche I grave lots contain any specific association with negative painting. These Moche I associations are so distinctive that Larco has defined a specific culture, "Viru de Chicama" [6] (Larco, 1948, pp. 26, 27), characterized by rare negative painting and typical black-on-white positive painting of negative designs. The lack of later "Viru" influence in Moche pottery does not support the contemporaneous existence of the negative art in the Viru Valley.

In addition, all the Moche ceramics are concentrated at the end of the Gallinazo development in the Viru Valley. Despite the closeness of the Chicama-Moche center, the Huancaco sherds are not scattered throughout the Gallinazo levels as would be expected of contemporaneous cultures, and as is true of the Callejon sherds. Further, the Moche remains in the Viru Valley include not only Moche IV, but all earlier periods as well. The only Moche stirrup-spouted vessel published which has full data associated with it is a Moche I specimen from burial G-5a, site V-59 (Bennett, 1939, Fig. 15, *b*). Bennett (1950, p. 97) states that the grave is intrusive through a terminal Gallinazo III floor, and therefore could be terminal Gallinazo III or post-Gallinazo. The latter now seems indicated. Although Bennett (1939, p. 74) was once inclined to see Chavin affiliations for this incised and polished black vessel, the spout and rayfish design are diagnostic traits of Moche I (Larco, 1948, p. 28). "A similar stirrup-spout container with an incised 'Recuay cat' design" was noted by Bennett (1939, p. 74) in the Larco collection. Other Moche I occurrences of the Recuay cat are shown in Larco (1948, p. 28, vessel 2) and Wassermann-San Blas (Figs. 64, 65). Bennett (1950, p. 118) considers this design element to be one of the specific Recuay influences appearing in Gallinazo III. The body position of the site V-59 burial was seated flexure, common in Gallinazo III and later; Larco (1945b, p. 24, left) illustrates this burial position, associated with

[6] Strong (1948, p. 99), in discussing the Gallinazo period, reports that Bird found an "almost identical culture" in the Chicama Valley, though Ford (p. 66) implies that the special "Viru de Chicama" is represented at Huaca Prieta.

Moche (III?) face collar jars. Perishable remains were associated with Bennett's Viru burial, a condition which is not typical of the pre-Huancaco period (Bennett, 1950, p. 97; Strong, 1947, p. 466). An associated tapestry was decorated with Recuay cats and Moche I rayfish. The bulk of the evidence therefore would support the contemporaneity of the grave contents, and an early Huancaco date. Insofar as this single grave is representative, a coexistence of Moche I with terminal Gallinazo III would be indicated.

Larco (1945b, p. 2) reports Moche IV over "Viru Auge" in the Tomaval site, and burials in the upper levels of site V-162 are also Moche IV (Strong, 1947, Huaca de la Cruz, p. 479). At the latter site, Strong (1947, p. 466) refers to a deep grave of Chicama type with remnants of pottery "more characteristic of earlier Mochica sites in the Chicama Valley than of the later Viru Valley Mochica."

The remaining Moche vessels from Viru which have been illustrated lack specific associations but are pre-Moche IV. Grave lots are needed to identify the vessels with certainty but Moche I is probably represented by Larco, (1945b, page 9, upper right). Moche II is indicated by two vessels (Bennett, 1950, Pl. 12, H, K), and Moche III by one likely specimen on Pl. 12, B. This group of pots illustrated by Bennett may represent the Moche II-III transition period. All other stirrup-spouted vessels illustrated for the Viru Valley (Bennett, 1950, Pl. 10; 1939, Figs. 13, 15c; Larco, 1945b, 2, 3, 7) have the crude shaping characteristic of local Gallinazo manufacture. Whether this spout form is derived from a Guañape, Salinar, or Moche source has yet to be determined; it is most similar to the Salinar form.

Three spout-and-bridge vessels illustrated by Larco (1945b, p. 5, lower left; p. 6, upper right; p. 7, upper) probably represent strong Moche influence on local Viru potters. The realism in the modeling is in sharp contrast to the conventionalization typical of Gallinazo art, yet does not equal Moche standards. Bennett (1950, Pl. 12, G) illustrates a Viru spout and bridge vessel with a Moche I design.

Thus all Moche subperiods but the last appear to be represented by Viru Valley graves and the only associations are terminal or post-Gallinazo III. The stratigraphic occurrence of Huancaco sherds at site V-162 indicates the same relative position for Moche influence. The contemporaneity of the early Gallinazo and Moche developments, as well as the dominance of the Viru Valley by Chicama-Moche groups in Moche IV times only, therefore need additional support.

The unity and limited temporal occurrence of the Huancaco ceramic type is broken by the terminal limits of the Gallinazo period which Ford uses. He makes the division at the height of the Huancaco Decorated frequency, and the distinction between late Gallinazo and Huancaco can only be determined by strip matching. Since these period boundaries are created by the classifier, a far more useful concept of the Huancaco period can be made by expanding the period to include the first appearance of the Huancaco Decorated sherds in quantity, i.e., by placing the top 4 to 7 levels of site V-162 in the Moche period as done in Figure 80[7]. In addition to providing a definitive ware, Huancaco Decorated, such a division would also provide an increased emphasis on the reduction fired Tomaval-Viru plain wares. The slight persistence of Gallinazo decorated sherds could be explained by mixed levels or, just as likely, as the terminal expression of the negative style.

More attention should be given to the extent of the Moche domination of Viru. If the postulated physical expansion from the north did not occur until Moche IV, the Moche I to III vessels found in Viru probably represent trade pieces, and the Gallinazo culture would then have continued to function beyond the terminal Gallinazo III of Bennett. This interpretation is supported by those vessels which are Gallinazo in form, but reflect Moche influence in modeling or design. The large number of Huancaco sites given in Appendix A implies a more extended contact than the single Moche IV period. Larco (1945b, pp. 14, 28) suggests the survival of a definable Gallinazo complex into Tiahuanaco times ("Decadent Viru"). In addition, there are some surface collections which by strip matching on a quantitative basis should be placed in the Huancaco period,

[7] The variation between the two cuts at this site is such that the specific quantity of sherds is needed to interdigitate the levels properly. Simple alternation has been followed in Figure 80. The Moche subperiod types represented by the Huancaco sherds should also be a valuable guide.

except that no Huancaco sherds were found. Ford does place one of these (V-39) in this period of Moche influence. Four other sites (V-114, 219, 294, and 131) have such types as Viru, Estero, Tomaval, San Nicolas, and San Juan which definitely conflict with their present late Gallinazo placement. All the sites have adequate sherd samples (286 to 608 sherds). This group of debatable sites can be enlarged if smaller sherd samples are considered adequate (V-30, 43, 231, 251, and 293). All these sites are plotted in Figure 79 on the basis of the reduced and oxidized ware frequencies. It should be noted that the unity of the Huancaco Decorated type is broken up when this group of sites having Huancaco period plain ware frequencies, but no Huancaco Decorated sherds, is interdigitated with the sites which do yield the Moche-influenced ware. This irregularity can be eliminated if the two groups are plotted separately, on the assumption that the Moche complex became established only at certain sites, while a modified Gallinazo tradition was carried on at other sites during the Huancaco period.

SUMMARY

As a participant in the Viru Valley Project, Ford undertook the analysis of the sherd collections from a large number of surface sites. His contention that a representative sample of surface sherds usually forms a related unit comparable to a stratigraphic level in an excavated site is supported by the evidence available. Ford has assigned a "mean cultural date" to each sherd collection, and implies that this date represents the period of average or longest occupation of the site. However, the few check samples which have been published for excavated sites suggest that the surface sherd unit usually reflects the terminal occupation of the site rather than a "mean cultural date."

Ford offers the Viru study as an example of quantitative method. In actuality, however, he has frequently relied on quality rather than quantity. In addition, Ford has assigned dates to a considerable number of sites which lack an adequate number of sherds to ensure a representative range and accurate frequencies of the ceramics used at the site. More proof is needed to support the temporal significance of the size variations used to distinguish between both Castillo and Valle Plain, and Tomaval and Viru Plain. When these size variants are combined, the plain wares do provide a consistent quantitative guide for the dating of surface collections.

The preliminary descriptions available imply that early Guañape pottery actually represents an incipient ceramic stage, the decorated wares of which are not comparable with the developed art style represented by Cupisnique artifacts. A similar pre-Cupisnique stage is found at Huaca Prieta in the Chicama Valley, and present evidence suggests that a distinct ceramic period should be defined.

The conceptual scheme of a uniform succession of horizon styles which is presented by the Viru Valley participants is much too simplistic even for the north coast of Peru. The pre-Moche styles of the Viru and Chicama valleys have numerous specializations indicative of local development. At the present time problems of contemporaneity and inter-valley relationships are only confused by the application of such terms as "Cupisnique," "Salinar," or "Ancon" to Viru Valley ceramic styles. Larco has presented evidence for a series of distinct ceramic units which he places in sequential order in the Chicama Valley: Cupisnique, Transitional Cupisnique, Santa Ana Cupisnique, and Salinar. Nothing approaching the complexity of Cupisnique or Transitional Cupisnique has yet been published for the Viru Valley. The Puerto Moorin period in Viru is presented as equivalent to the Salinar period of Chicama and as additional proof of a distinct white-on-red horizon period. However, the occurrence of white-on-red ceramics as an isolated style in Viru has yet to be demonstrated. The stratigraphic, areal, typological, and mortuary evidence available in print is insufficient to support the present concept of the Puerto Moorin period.

Speculation is fruitless until a redefinition of this period appears, but the following suggestions can be stated briefly: Site V-272 should be included with late Guañape. "Typical" Huacapongo Polished pottery should be separated from its present plain ware matrix. If this type is clearly distinct from Gloria Polished Plain, a Guañape subperiod may be represented, comparable to Santa Ana Cupisnique. Guañape decorated types are found in all levels of site V-272.

Although Puerto Moorin W/R and Gallinazo Negative are fully contemporaneous at site V-51, there is a concentration of W/R decoration in the lower levels, with negative painting more frequent in the upper levels. The Castillo Modeled and Incised types, also diagnostic of the Gallinazo period, remain constant throughout, however. Whether this early time segment should be called Puerto Moorin or early Gallinazo will depend on the quantity of W/R ceramics which can be isolated from Gallinazo decorated types.[8] More attention should be given to the possibility of the contemporaneous diffusion of W/R and negative painting from different centers. The persistence of both of these decorative techniques into later periods is manifest. The association of Chavinoid motifs with negative and polychrome painting at Paracas Cavernas and Ocucaje, as well as the stylistic similarities to Chavin found in Moche and Nazca art become less puzzling if the intermediate W/R horizon is eliminated or condensed. All available information suggests that the basic problem involved is a fluctuation in decorative technique during which the plain ware development was relatively unaffected.

The significance of the three Gallinazo subperiods should be clarified. The quantitative variation during this period is too slight to emphasize in classifying sherd collections. No satisfactory definition of early Gallinazo is possible at present. Middle Gallinazo grave wares are defined in contradictory terms, and Ford's arrangement of levels does not support the diagnostic differences of Gallinazo III which have been claimed by Bennett. At present the changes in architecture furnish the best means of subdividing the Gallinazo period, and since an "initial" and a "terminal" Gallinazo III can be defined in terms of architecture and probably pottery, a fourfold division of this negative period may be indicated. In addition, there may be reason to define a still later phase of Gallinazo to represent those sites which have Huancaco period plain ware frequencies but which lack Huancaco Decorated sherds.

On a quantitative basis it would be more meaningful to begin the Huancaco period with the shift to reduced firing, expressed most clearly by the increasing percentage of Tomaval-Viru Plain. Such a division would also include the increased frequency of the Huancaco Decorated sherds. This expansion of the period of Moche influence is more consistent with the varied Moche types found in Viru, and provides more time for the diffusion of this influence as far south as Nieveria. Available evidence does not support the claimed contemporaneity of Moche I with Gallinazo I.

The quantitative revision made herein increases the number of La Plata collections, and suggests that a shift back to oxidized firing may have been in process at the time of the Spanish conquest. This interpretation is dependent on the validity of the late plain ware types.

[8] Sherd beads similar to those found with a "Puerto Moorin" burial at V-66 also occurred stratigraphically in early and middle Gallinazo levels (Bennett, 1950, p. 102).

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FACTS AND COMMENTS

REPLY TO "THE VIRU VALLEY SEQUENCE: A CRITICAL REVIEW"

Mr. Bennyhoff was kind enough to allow me and other members of the Viru project to read his article (p. 231 ff.) after he had sent it to the editor of *American Antiquity*. Drs. Bennett, Strong, Evans, Collier, and I each sent detailed comments to Bennyhoff in the hope that the already muddled literature on Peruvian archaeology would be spared additional confusion. These suggestions were declined, so a published reply becomes necessary.

It is impossible to present here the detailed reply submitted to Bennyhoff. Probably the majority of readers are not interested to that extent. A few selected and summarized comments, however, do seem worth while.

1. Despite the kind words in Bennyhoff's opening paragraphs, Ford's paper is in no sense a complete report on the work of the Viru project, and is hardly open to scattered criticisms for not having given data which will be presented in the reports of Strong and Evans, Willey, and Collier (Ford, p. 44).

2. As to the question of whether surface collections usually reflect "mean dates" for sites, his laborious demonstration is invalidated by the fact that the evidence used was selected—rather carefully selected—by the Viru workers. There are relatively few deep midden deposits in the valley, and most of those discovered are represented in the excavations of Strong, Evans, Collier, Bennett, and Ford. That surface collections give terminal dates for some of these sites has no bearing on their significance for the great majority of shallow sites that I tried to date by this means. A somewhat more detailed discussion of this problem, in a similar situation, will be found in a recent publication (Phillips, Philip, James A. Ford, and James B. Griffin. Archaeological Survey in the Lower Mississippi Alluvial Valley. Papers Peabody Museum of Archaeology and Ethnology, Harvard University, vol. 25, pp. 231-6).

3. In discussing size of sherd sample, Bennyhoff assumes that 200 sherds are necessary for "adequacy," and ignores the statement that I intend to use collections as small as 50 for quantitative comparisons (Ford, p. 36). The evidence or experience which entitles Bennyhoff to express an opinion on this very uncertain question is not apparent. He misunderstands the significance of the loose dating given for small unreliable collections which I explained (p. 51), and his discussion of the overemphasis of small frequencies in graphing, is far from clear.

4. Bennyhoff's arguments for the elimination of the I-K Puerto Moorin period are primarily based upon his conclusions that the classifiers of Viru Valley pottery have made a serious error in setting up the type Huacapongo Polished Plain. Everyone who has worked with the material is convinced that this is a distinctive and easily recognizable category, and perhaps Bennyhoff would be less willing to press this point if he had seen samples of Viru ceramics. The evidence for the occurrence of Puerto Moorin White-on-Red in the Puerto Moorin period will be presented in the report of Strong and Evans, now in press.

5. The rearrangement of the dating of late sites is based upon the assumption that the seriation of surface collections which Bennyhoff has made after merging several of the types, reflects cultural history more accurately than does the stratigraphic excavation I used. A number of such seriations of surface data were made in Peru before the stratigraphic data became available, and although they have a more handsome appearance were discarded in favor of the information from strata cuts (Ford, p. 44).

6. The discussion of the typology of Huacapongo Polished Plain, Valle Plain, Viru Plain, and the criticism of the naming of Ancon Fine Line Incised reveal a certain lack of understanding of the methods and purposes of our classification of ceramics.

Mr. Bennyhoff has expended considerable work on this critique and raised a number of questions that need further attention. It is regrettable that errors and misleading statements, pointed out to him by Bennett, Strong, Collier, Evans, and Ford, were not corrected before publication, and that he did not take advantage of the data which Strong, Evans, and Collier briefed in letters and will publish in a few weeks. It seems to me that the way in which this paper has been presented does not conform to the trend that has been developing in archaeology for the free exchange of information and ideas before publication, but rather belongs to a pattern of competitive scholarship which our study has almost outgrown.

James A. Ford
American Museum of Natural History
New York
October, 1951

RADIOCARBON CONTAMINATION

Before rushing into a revision of archaeological chronologies based upon the dates recently published in Memoir 8 of the Society for American Archaeology, the possibilities for the contamination of carbon should be considered. The dates given so far are from specimens found in widely divergent deposits and environments; they come from caves, bogs, Egyptian tombs, lake beds, deep deposits, shallow deposits, wet deposits, dry deposits, exposed deposits, and excavations; from material carefully removed and from other material which may have been molding in storage for years. The recognition of this diversity alone should produce caution in accepting radiocarbon dates as unassailable. Contamination of samples for dating can occur at a variety of times. It could happen prior to discovery or

during excavation and removal, or in the archaeological laboratory, or even in the laboratory where the dating is done.

The sorption properties of charcoal that make it valuable as a commercial water and gas purifier are the very properties that readily invite contamination, or the mixing of recent carbon 14 atoms with older atoms deposited by nature in an organic substance. Carbon and carbon compounds included in charcoal, shell, bone, wood, and other organic substances have varying sorption properties which must be considered as a means for the contamination of the organic specimens used for radiocarbon dating. Purification of the samples in the nuclear laboratory does not insure the removal of the contaminating carbon lodged within the specimen. There it remains with its radioactive carbon atoms present to cause inaccuracies in the dating of the specimen.

Several agencies may produce contamination prior to the time when the specimens are removed from their matrix: 1. *Chemical contamination.* Numerous carbon compounds occur in nature, primarily the hydrocarbonates, which may be carried in water as solutions, as colloids, or as emulsions. These may be carbohydrates such as sugars, starches, fats, and alcohols. The carbon may be in protoplasm, or in carbonic or other organic acids. These compounds in water passing over charcoal may be removed by sorption, passing into the charcoal to become an integral part of it. 2. *Water contamination.* In addition to water being a carrier of chemical carbon compounds it is also a carrier of micro-organisms which thrive within it. These deposited upon an organic sample for dating would contaminate it. 3. *Plant contamination.* Root systems penetrating to a deposit form a source for contamination. The contamination may be primary with the roots growing in and around the specimen or secondary when the root holes permit the entrance of water bearing contaminating carbon or the entrance of bacteria and molds which form carbon compounds. 4. *Bacteria and mold contamination.* Bacteria and molds within the earth can grow in contact with the specimen or be carried to it later. 5. *Animal contamination.* Burrowing animals may cause depositional disturbances, they may transport organic substances down their burrows, or they may die within the burrows, all factors producing a potentional contamination of a sample. The burrows may permit the entrance of water, bacteria and molds, and plant roots. 6. *Mechanical contamination.* Mechanical disturbances may be caused primarily by water, wind, or gravity which cause disturbances or redeposition of, or within, the deposits.

As the rate of decay of isotopes is given as ten to the tenth power it may readily be seen that a small amount of contamination by recently formed carbon 14 atoms will have a profound effect upon old carbon samples. Thus, there are two factors to be considered in contamination, (1) the time of contamination, and (2) the amount of contamination. A small amount of contamination from a recent organism could have the same effect as a large amount of contamination at a period nearer the time the sample was deposited.

Controls should be established to determine the types of specimens and deposits which may be used to produce accurate dating results. Bogs, swamps, muskegs, lake beds, marine silts, and similar types of deposits where water was and/or is present furnish ideal conditions for contamination. From deposits where saturation was heavy there is a gradation to deposits that received little or no water which may have contaminated the charcoal or other organic substances in them. Regardless of the care with which a sample is handled, the contamination prior to its removal is beyond the control of the archaeologist. Tests should be established for determining the amounts of contamination. Two samples of the same material of the same age might be taken from different parts of the same deposit. For example, a sample from a dry part of a cave tested against one from the wet part; or a piece from a log above the frost line of a muskeg and a part of the same log buried deeply below the frost line. Both samples might be contaminated but tests might show the difference in contamination of these samples which are of the same age. Numerous other field and laboratory tests could be made.

After considering the many factors and possibilities for contamination the writer is convinced that many of the published dates cannot be considered as valid. Furthermore, no attempt should be made to re-evaluate indiscriminantly the archaeological chronology using the radiocarbon dates, until the possible factors for contamination have been eliminated or minimized. Due to the rate of decay of the carbon isotope and the factors which may cause contamination, the great majority of the real dates of contaminated specimens will probably be older than indicated by the radiocarbon analysis.

Wesley L. Bliss
University of Arizona
October 1951

AN INDUCTIVE APPROACH IN THE TEACHING OF ARCHAEOLOGY

Archaeologists, by and large, have been too much engrossed with the problems of their own specialty to give much thought to pedagogy. So long as archaeological teaching remained largely in the graduate schools, where the training of would-be specialists is supplemented by museum projects and apprenticeships in the field, the situation did not greatly matter. The spreading popularity of anthropology has led to the establishment of undergraduate programs in anthropology, with the frequent inclusion of one or more survey courses in archaeology. In the light of this development it seems advisable to take stock of current methods of teaching the subject and give thought to the possibility of making our methods more effective.

If, as is sometimes maintained, archaeology is a science, it would appear highly desirable that, insofar as it is possible, the student should acquire his knowledge thereof by observation of the data. The teacher of chemistry is not content to let his students learn the properties of hydrogen by listening to a barren recital of these. The student must go into the laboratory, prepare the gas for himself in accordance with directions in a manual, and then subject it to various indicated tests so that he knows from firsthand experience what the properties of the gas are. Every effort is made to duplicate for him the experience of the original investigator. He thereby learns the thrill of discovering by doing.

Contrast this procedure to that commonly followed in the teaching of archaeology. Let us suppose that we are giving an introductory survey course in American archaeology, and we are ready to study the archaeology of the Arctic area. Perhaps we are using as a textbook Martin, Quimby, and Collier's *Indians Before Columbus*. If so, the student has access to compact descriptions of eighteen different cultures, all neatly catalogued and dated, but his assignment will hardly provoke any intellectual process other than memorizing, and no more of that than the expected exigencies of a final examination may require.

If no textbook is employed, the student may be asked to read the section on Eskimo prehistory in Volume 100 of the Smithsonian Miscellaneous Collections. This will give him the enormous advantage of gaining some insight into how an archaeologist's mind works, but the method of teaching will remain the very antithesis of induction. At the very outset, he reads of Mathiassen's discovery of the Thule culture, which Mathiassen was able to show—so the book tells him—"must have originated in the west, somewhere along the coasts of Alaska or Siberia north of Bering Strait." On the same page, he will read: "Scattered widely throughout the eastern Arctic . . . are found the remains of another prehistoric culture which differed fundamentally from the Thule. This was the Cape Dorset culture. . . ." The reasons for these statements come much later. Similarly, the Punuk culture is introduced as "intermediate between the Old Bering Sea and the modern," "contemporaneous with, and in certain respects equivalent to, the Thule."

Nothing in this discussion, naturally, is to be construed as being in any sense a criticism of Collins' summary of Eskimo prehistory; on the contrary, Collins gives an objective presentation of the results of all research in this field up to the time of writing, and his work is of inestimable value to all Americanists. My whole point is to show that we do not possess a textbook which leads the student into archaeology via the inductive method. How much better it would be if we could place into the hands of our students lists of the principal items in Thule, Cape Dorset, Old Bering Sea, and Punuk material cultures, accompanied by representative illustrations and notations of their differentiating features, which they would study until they themselves discovered that there are fundamental differences between Cape Dorset and Thule cultures, and that Punuk occupies an intermediate position between Old Bering Sea and modern. We could then grade students, not on the excellence of their ability to memorize, but on the keenness of their powers of observation and induction. They could be encouraged to develop their own schemes of historical construction, aided by the instructor only to the extent of providing any available data which they themselves might request. Only after this operation should they be permitted to examine the arguments of the specialists, whereupon they might wish to modify their own interpretations.

Such a program is admittedly difficult to execute, largely because our materials are not organized to this end. A few years ago at Hunter College of the City of New York, I made my first faltering experimental attempt to carry out, as part of an undergraduate survey course in American archaeology, a program of this kind. The same opportunity later presented itself in a course on the archaeology of Middle and South America, wherein the emphasis falls naturally on the high cultures.

At the very outset each member of the class was given an outside reading assignment covering some topic in South American archaeology to be reported during the latter half of the course. This assignment, entirely at variance with the method I am advocating, was made for two reasons: first, the allotted class time in a one-semester, three-hour course would not begin to satisfy the demands of the newer method, if it were to be applied to all of the vast subject matter to be covered; second, it seemed prudent to make some concession to current academic practice (there must be home work). But, in the Mexican field, the class was specifically requested to read absolutely nothing, in order to avoid any premature conclusions.

It is customary, I believe, in courses of this kind to begin with a discussion of American Indian origins, the problem of antiquity of man in America, and the question of where and how agriculture in the New World began. Attention is next directed to definite areas; the regional manifestations of what Vaillant termed the Middle Cultures are described, and an attempt is made to trace cultural evolution through the Classic phase and on to the Late, with the study finally culminating in a presentation of the aboriginal culture as seen through the eyes of the Spanish conquerors. This is all very well for students of history, but for students of science the process needs to be reversed.

Accordingly we began with a description of the functioning Aztec culture, telling the students that it was their job as archaeologists to find out whence it came and what preceded it. We looked into the matter of what the Aztecs themselves had to say on the subject, then turned our attention to archaeological finds. As a preliminary exercise, we handled a miscellaneous collection of figurines, the students sorting them and assembling them by type. We tried to evaluate the artistic ability of their makers and to infer such culture

traits as dress and ornament might provide. Next we studied photographic collections of prehistoric Mexican art, such as Theodor Danzel's *Mexiko* (Volume II), Walter Lehmann's *Arte Messicana Antica*, and Medioni and Pinto's *Art in Ancient Mexico*. These enabled us to associate certain styles with particular areas and sites. The books mentioned possess a special advantage in that the illustrations are not labeled. To learn the provenience of the objects shown the novice must consult a special index or table, but the alert student who has gone through one of these collections slowly, jotting down pertinent observations and learning from the instructor the source of each specimen, will do a good job at guessing the sources of the specimens he sees in the next collection.

We are now ready to consider specific archaeological activities. We learned how the cyclical dumps of the Aztecs have enabled archaeologists to recover almost three centuries of Aztec history with something like an absolute chronology. We followed the work of Linné at Teotihuacan and of Vaillant at the Middle Culture sites of the Valley of Mexico, always devoting a good bit of the class session to the drawings and photographs to be found in the corresponding papers and monographs. Gradually the story unfolded.

By the time we were ready to talk about Monte Alban, I did not have to lecture about the diagnostic traits of the five periods, while the class scribbled frantically to get each precious word down in their notebooks. Fortunately I possess about 500 drawings of the Monte Alban material. These were laid out on tables, arranged according to period. The class had only to inspect the drawings and take note of similarities and differences between periods. They had no difficulty in discovering for themselves the Teotihuacan traits of Monte Alban III. My contribution was limited largely to explaining the basis of the stratigraphy and supplying the ethnological setting.

Lack of time has hampered us in the attempt to extend these procedures to the Maya area. Here again, nevertheless, we have concentrated on the plates in the monographs, noting salient features and making comparisons between materials from different sites. We have probed the workings of the Maya calendar, and each student has been required to check a Long Count date and correlate it with the Christian calendar. In my own student days I sat through several courses in which the Maya calendar was explained, but only once (under Caso) was I required to make such a computation. The exercise probably should be a routine requirement, for no other classroom experience can create a more "on the spot" feeling for Maya archaeology.

I would be the first to acknowledge that I have fallen considerably short of the goal which I set for myself in this teaching enterprise. I have not been able to impart the same quantity of information as I might have dispensed by more conventional methods, nor have I altogether succeeded in creating for the student the illusion that he (or in this instance, she) is "doing" archaeology. As already intimated, there are two chief reasons for these shortcomings.

There is, first, the great obstacle of insufficient time allotted to the course. This could be overcome by the logical expedient of doubling or tripling class-session time without increasing the academic credit, in accordance with established practice with regard to laboratory sessions in physical and biological science. Then, just as students of biology sketch the anatomical parts of a grasshopper, students of archaeology would copy glyphs and make drawings of pottery vessels, projectile points, figurines, etc. Problems in classification, stylistic development, and cross-cultural inferences could follow.

The second obstacle is the lack of appropriately organized material. Representative collections of archaeological specimens, if made available by museums for loan or rental, would be invaluable in this connection. More comprehensive slide and film-strip libraries are greatly needed. Most of all, in my opinion, we need large wall charts illustrating typical finds from important sites arranged in their proper stratigraphic order. Such charts would necessarily constitute oversimplifications of field conditions, but, if hung side by side where the student could inspect them at his leisure, they would encourage and facilitate comparative studies. Other charts might represent completely unorganized collections of objects whose designation and classification would become the exercise of the student. In lieu of the latter, sets of cards, each illustrating a specimen, but bearing no label except a numeral the key to which would be held by the instructor, might be placed in the hands of the student for identification.

I would further venture to suggest, in line with these methods, that we need a new type of textbook—textbooks that will pose problems whose solution may be found in the back of the book (as in our time-honored textbooks in mathematics)—rather than books which do all the thinking for the student.

I do not mean to imply, of course, that archaeology should be reduced to typology, a mere study of artifacts, any more than that biology can be learned merely by dissecting representative specimens of plant and animal species. We must still rely upon lectures and outside reading for matters of theory and method in archaeology, climatic and other ecological factors bearing upon archaeological problems, and ethnological insights—to mention but a few of the topics essential to a well-rounded and meaningful presentation of the subject. What I do contend, however, is that something in the nature of an archaeological laboratory should be regarded as an indispensable auxiliary to the teaching of archaeology.

C. W. Weiant
Hunter College
New York
May, 1951

TRAVERTINE VASE IN THE GUATEMALA NATIONAL MUSEUM

In the superb Dieseldorff collection, located in the Guatemala National Museum is an effigy vase hitherto unpublished which is thought worthy of description and comment.

This vase, Museum number 5923, represents a kneeling monkey; most probably a spider monkey (Fig. 81, *a, b*). The pear-shaped vase represents the body. The head and arm projects in full relief from the wall of the vessel, while the legs and a part of the tail are in somewhat lower relief. The monkey is clasping his long, curled tail by both hands above his head. Part of the rim, the left arm, and part of the tail are broken off (see Fig. 82, *a, b.*)* Minor details such as fingers, eyes, and mouth were made by incising and grooving. The height of the vase is 14 cm. It is of unknown provenience but is thought to have been found near San Pedro Carcha (Alta Verapaz) by the late E. P. Dieseldorff.

* The drawings for this article were made by Don Oscar Gonzales Goyri.

The vase, a yellowish-white in color, was identified as being made of alabaster. In a letter of March 20, 1951, Dr. W. F. Foshag, Head Curator of the Department of Geology of United States National Museum informed me, after he had examined a small sample, that the material in question is not alabaster but is calcite ($CaCO_3$) of the type known as travertine. Travertine is a form of calcite deposited about springs and may be porus as the so-called "Roman Travertine" or compact like the "Mexican Stone." Frequently, as is the case with the specimen of this paper, it is laid down in distinct layers so that it resembles onyx (silica) and is then sometimes called "Mexican Onyx." This term is, however, somewhat confusing since a number of persons have interpreted this to mean a true form of onyx which is not the case. True onyx is a compact form of quartz, or a banded variety of calcedony and is mineralogically closely related to flint. The name "alabaster" or "white, translucent marble" has crept into the literature and thus many travertine vases (such as the *tecali* vases) have been erroneously labeled in publications and in museum files.

Alabaster is a form of gypsum ($CaSO_4$). An easy way to eliminate such erroneous labeling, and of distinguishing between the two minerals, is by applying a

a *b*

FIG. 81. Travertine vase in the Guatemalan National Museum (Museum Number 5923). Height, 14 cm. *a*, front view; *b*, three-quarters view.

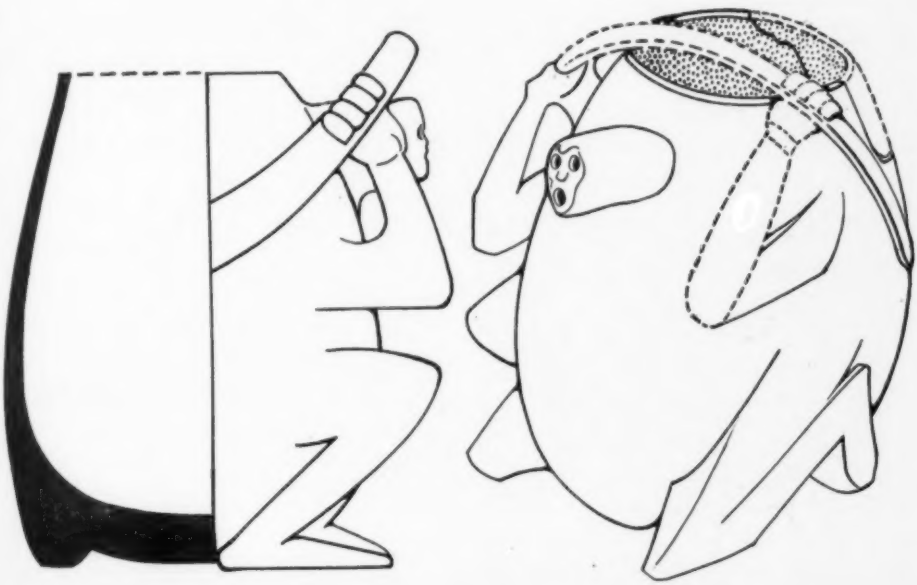
drop of dilute hydrochloric acid with a glass rod or toothpick to the surface of the mineral in question. If it is travertine it will effervesce briskly. If it is alabaster or marble there will be no visible action. However, true alabaster, such as was used so widely by the ancient Egyptians, has not yet been found in Mesoamerica according to Foshag. It seems, therefore, that a thorough revision, both of the literature and of museum files, is in order.

Tecali or "Mexican Onyx" is an ideal medium among craftsmen. When cut it is smooth and soft and sometimes has a translucent warm ivory color. Its adaptability to fine details made it a natural choice for *objets de luxe*. Not the least of its virtues was its relative cheapness. Cut in blocks or slabs from quarries it was carved easily and quickly, probably virtually "on the spot" as in Figure 83 (see also Saville, 1900).

It is of interest to note that two pear-shaped effigy vessels from central Mexico have been found which are nearly identical with the one in the Guatemala National Museum, particularly when we recall that the known principal sources of travertine in ancient Mesoamerica were the states of Puebla and Oaxaca in Mexico where it is still being mined. They represent monkeys in a squatting position. One of these vessels is on exhibit in the National Gallery of Art and belongs to the private collection of Robert Woods Bliss (Bliss, 1947, Fig. 96, p. 21). It is described as an alabaster vase. The vessel represents a squatting monkey, encircled by his long tail which he holds by both hands over his head. Toes and fingers are represented by incisions. The effigy vessel in the Dieseldorff collection differs from the one in the Bliss collection in size (Bliss specimen, 32 cm.), in the position of the left knee which is kneeling rather than squatting, and in the upcurled rather than downcurled tip of the prehensile tail. The exact provenience of the Bliss specimen is unknown but it is said to come from central Mexico.

The other monkey effigy vase depicts the animal in precisely the same half-kneeling, half-squatting posture as the specimen in the Guatemala National Museum. He also holds his tail high above his head. The material here, however, is highly polished obsidian rather than travertine. This specimen (illustrated by Bernal, 1950) is located in the Mexico National Museum of Anthropology, Mexico City, and is believed to come from the Lake Texcoco region.

It is quite obvious that these pear-shaped monkey vases, although of different materials, are similar in concept and in craftsmanship. This suggests manufacture during the same period and in the same area, most likely in central or southern Mexico.



a *b*

FIG. 82. Travertine vase. *a*, section drawing; *b*, restoration drawing.

According to Thompson (1941, p. 44), the spider monkey with its long prehensile tail curled at the end, was a tremendously popular subject during the Holmul V, Tepeu 2-3 periods and during the fine-orange, plumbate and Nicoya-effigy-polychrome horizons. Furthermore, he and Kidder (1947, p. 37), on the basis of stratigraphic evidence, are undoubtedly correct in believing that the *tecali* vases and in particular monkey effigy vases with pear-shaped bodies are of post-Classic date and probably traveled together with plumbate and fine-orange wares as well as copper objects.

Monkey effigy vessels could mean a Pipil or Mexican occupation as suggested by Thompson. On the other hand, there is little doubt that attractive art objects, such as these travertine vases, must have been highly favored by traders and therefore distributed widely throughout Mesoamerica irrespective of political, ethnic and religious pressures. In my opinion, the travertine monkey effigy vessel in the Dieseldorff collection represents just such a trade piece. Moreover, it is interesting to note that in Chama (Alta Verapaz), not too far from San Pedro Carcha, during an excavation by Mary Butler (1940, Pl. IX, Fig. *o*) a cylindrical travertine vase, subsequently labeled as alabaster, was found in association with fine-orange and effigy-plumbate and other sherds from travertine vases (Chipal 2, Alta Verapaz Period III, Early Post-Classic). This may indicate that travertine vases during this period were frequently on the import list of the inhabitants of the Alta Verapaz.

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April, 1951

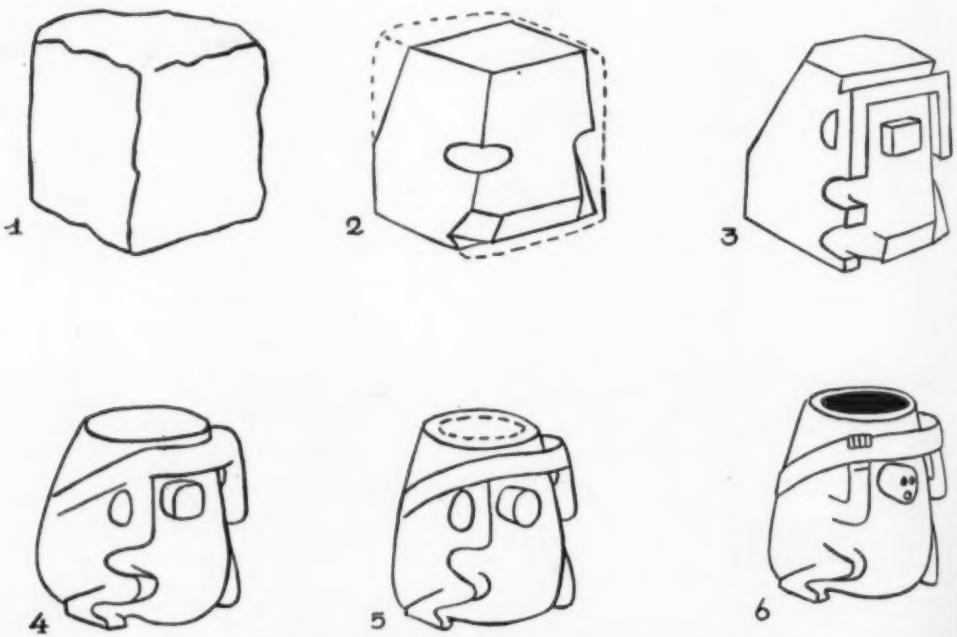

FIG. 83. Possible reconstruction of the process of manufacturing travertine vases.

FURTHER COMMENTS ON SIMPLE-STAMPED SHELL-TEMPERED POTTERY*

Harrington has called attention (*American Antiquity*, Vol. 13, No. 3, pp. 251-52, 1948) to pottery from Roanoke Island having shell temper and a simple-stamped surface, presumably a heretofore unknown combination. It may consequently be of some interest to note further the occurrence of such a type from a mixed Colonial and Indian midden at what is thought to have been the site of a Colonial trading post at Kecoughtan, near Hampton, Virginia (Joseph B. and Alvin W. Brittingham, Sr., The First Trading Post at Kicotan [Kecoughtan], Hampton, Virginia, Hampton, 1947). In 1945 this site, threatened by rapidly expanding housing developments in the area, was partially excavated by the Brittinghams, aided by a grant from the Mariner's Museum, Newport News, Virginia. The material recovered from the site has since been donated to the United States National Museum.

A few months after this material was donated, Asa Gray Phelps of Hilton Village loaned to Clifford Evans of the National Museum a series of potsherds which he had recovered from the same site in an area adjacent to that in which the Brittinghams had worked. Evans very kindly made these sherds available to me for study, and the type description which follows is based on both the Phelps and Brittingham collections.

Simple-stamped pottery studied from the site consists of about half of one vessel, 13 rims, and 190 body sherds. The name *Roanoke Simple Stamped* is suggested on the basis of Harrington's earlier noting of the type. The type description follows:

ROANOKE SIMPLE STAMPED

METHOD OF MANUFACTURE: Coiling.

PASTE:

Temper: Generous amounts of coarsely crushed shell (species identified in one instance as *Volsella demissa* Dillwyn by R. Tucker Abbott, United States National Museum), frequently considerably leached.

Texture: Cross-sections irregular, contorted; shell fragments oriented in all directions; small ochrous nodules present in paste.

Hardness: 2.0 to 2.5; usually scratched by fingernail.

SURFACE FINISH: Exteriors simple stamped; crossings frequent and characteristically oblique (about 45°). Rarely, brushing seems to have preceded the application of the simple stamp. Lip may bear transverse linear markings (simple stamp). Interiors smoothed, fine finger striations; surfaces uneven because of coarse temper and indifferently smoothed coils.

DECORATION: None.

FORM:

Rim: Direct to very slightly flaring.

Lip: Thin and rounded; may be slightly flattened by simple stamp.

Body: Elongated.

Base: Rounded.

SIZE: Small to medium-sized vessels indicated. Average thickness, 6.5 mm.; range, 5-10 mm. (rim and basal extremes).

DIAGNOSTIC FEATURES: Simple stamping, shell temper, simple elongated form. See Figure 84.

Although so far not known in quantity from any site, the geographic distribution of this type appears to be less limited than was originally supposed. Harrington mentions a shell midden on Cape Hatteras which produced a few sherds of this pottery.

Sherds of this type occur in the collection of Jerome K. Knowles, of Newport News. These were recovered by Knowles a number of years ago from a site now destroyed, which was located between present Pier 5 and the ferry slip at Newport News Point. He reports that the level producing this pottery was immediately overlain by one producing hundreds of white kaolinite pipe fragments to the practical exclusion of any other cultural remains. This large trade pipe collection, is notable, incidentally, for the variety of forms as well as maker's marks and other designs which it contains.

FIG. 84.

* Published by permission of the Secretary, Smithsonian Institution.

The presence of Roanoke Simple Stamped at three other localities is indicated by the National Museum collections. Of six potsherds (NM 380175) from an ossuary excavated by T. Dale Stewart on the York River near West Point, Virginia (Journal of the Washington Academy of Sciences, Vol. 30, No. 8, 1940), three prove upon examination to be of this type. Three others are shell-tempered, but their surfaces are too weathered to permit full identification. Two sherds, clearly of this type (NM-136038), were collected by W. H. Holmes from the locality of Long Creek and Lynnhaven Bay, Virginia. An entire pot (NM 230176), said to have been found in the Chickahominy River of Virginia, and presented to the Museum in 1904 by Chief Adkins of the Chickahominy tribe, is typical in every way, except for broad (5-7 mm.) vertical scraping marks on the interior and a lesser degree of definition in the surface stamping. The surface appearance of this pot is exactly duplicated by one of the York River sherds; possibly both should be considered a variant of the type.

The presence of simple stamping on a shell-tempered paste, although possibly only recently recognized, seems hardly surprising when we consider the numerous and widespread occurrences in later horizons in the eastern United States of practically all other known types of surface treatment on shell-tempered wares. Cord-marked shell-tempered types are legion; twined fabric impression, net impression, complicated stamping, and check stamping also occur on shell-tempered pastes. All these surface treatments, like simple stamping, begin in early, if not the earliest pottery levels, and in these horizons are on grit or sand tempered wares. It seems reasonable to suppose or even to expect a certain amount of persistence of these surface treatments to later periods when the use of shell tempering was prevalent.

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May, 1951

MIDDLE TRES ZAPOTES AND THE PRE-CLASSIC CERAMIC SEQUENCE

When in the past I have listened to writers of scientific reports bewailing the fact that their writings have been misunderstood or misinterpeted, I have been inclined to pass severe judgment: An author should be able to express what he thinks in a clear manner—no reader can be expected to read with the report in one hand and a crystal ball zeroed in on the author's mind in the other. Consequently when, on re-reading Wauchope's recent (1950) stimulating attempt at coordinating the welter of data on Mesoamerican ceramics, I find myself in the unhappy situation of having been misunderstood, I cannot but feel embarrassed. Wauchope obviously cannot be blamed for not being able to guess what I had been thinking while writing on the stratigraphy of Tres Zapotes pottery. It seems important to clarify the matter in order to avoid perpetuation of my error.

It so happens that there are two reports on ceramics from Tres Zapotes extant, mine (Drucker, 1943) and Weiant's (1943). Both happened to be published in the same year (even the "Letters of Transmittal" bear the same date), although Weiant's paper was based on materials collected a year earlier than mine (he worked at Tres Zapotes in 1939, and I in 1940), and his report was completed before my own. Basically the two are quite different. His field work was essentially a reconnaissance approach and his interests lay in comparing particular specimens with types from known centers elsewhere in Mesoamerica to search for influences and relationships. In fairness, there is nothing wrong with such an approach or interest, at least so long as the latter does not involve an *a priori* assumption that the culture of the site being investigated could not have been an integrated manifestation in its own right but was simply a hodgepodge of traits from the known centers. My approach differed: It was to adhere to the rules of stratigraphic method. My interests likewise differed, since they were first of all to try to work out sequences of culture-growth within the site, and only secondarily, if the evidence of itself suggested it might be profitable, to follow trails of external influences. It is expectable that we might have arrived at not altogether similar conclusions, but in point of fact, our final conclusions differed widely.

After completing his fieldwork, Weiant departed from his comparative approach to the extent of trying to work out sequences within the site. He believed that he could define three sequential members in the culture-column. At first, as I recall, he designated them Upper, Middle, and Lower (or perhaps it was "Early, Middle, and Late"). By the time he submitted his report, I had defined a "Lower" horizon which was obviously not included in his material. (We were neither of us very original about our terminologies!) Matthew Stirling, Chief, Bureau of American Ethnology, to whom both Weiant's and my report were submitted, saw the over-all problem and the inevitable confusion that would result from our using the same names for different horizons in two monographs in the same series. He urged that we work out a compromise. I preferred to stick with something like "Upper, Middle, and Lower" because of the connotation of the relationship between parts of a whole; I was already beginning to see the Tres Zapotes ceramics as the manifestation of a single pottery tradition, which in the course of time and in response to internal and external stimuli had developed the latest patterns out of the earliest styles and techniques. (The intrusive Soncautla complex is of course quite separate and distinct.) Finally it was Weiant who undertook to revise his terminology, even though this meant going through the final smooth draft of his report to do so. His "Lower" (or "Early") he made into "Middle A." "Middle" became in his final version "Middle B." This, in a rough manner, equated the two reports terminologically. Weiant's "Middle A" and "Middle B" combined were supposed to be the equivalent of my single "Middle" phase, although actu-

ally they are not. Likewise our two "Upper" complexes were supposed to compare roughly, except that Weiant was unable to sort out the Soncautla materials that I could show were unconformally intrusive into the site.

The difficulty that Wauchope had to contend with in including the Tres Zapotes materials in his synthesis is that my Middle materials showed no sign of a break that would warrant dividing the horizon into two segments. Rather, they indicated gradually changing preferences for certain of the wares, as indicated by the varying percentages of sherds of all types from the Middle stratigraphic levels which, if plotted, would result in smooth regular curves. In other words, an unbroken continuum of ceramic patterns, rather than a succession of phases, was indicated. I considered my methodology the more accurate, and the more sensitive to culture change, because the materials were collected and studied on the basis of well-kept levels, whereas Weiant did not dig by levels, nor did he segregate his materials systematically (he kept records of depths of burial materials, but failed to distinguish between grave-lots and materials accidently included in the pitfall). In addition, my Middle phase materials were complete series of all the sherds recovered in the three trenches where the phase was encountered (a total of 12,725 specimens identifiable as to ware), while Weiant saved only rims, sherds with appendages (spouts, handles, lugs, supports, etc.), and decorated ones, which, had he dug stratigraphically, should have given him a picture of the trends and/or sequences in those traits, but not an accurate one of the wares themselves. When it is also noted that Weiant's collections came principally from cuts into mound-fill which are very likely to contain mixtures of the wares of previous periods as well as ceramic patterns contemporaneous with the mound construction, whereas my stratigraphic sections were from occupation areas with an accumulation of pottery and occupational debris, the different values of the two lots of materials for minute analysis seem obvious. I felt therefore that the weight of the evidence (Drucker, 1943. See especially Tables 1 to 8, and Appendix A, which give vertical distributions of wares and subwares) when evaluated in terms of the respective field methods used (my methodology was briefly but specifically described, for this reason), was so patently opposed to a division of the Middle phase into two segments, that there was no need to belabor the point. I suppose I was diffident about it because I was a member of the same organization Weiant had been with, and was continuing his work, and moreover I was a tyro in Mesoamerican archaeology. Besides I had already borne down hard on his "Upper" phase to show that it really consisted of two non-conformable segments. Hence I was loathe to mount an all-out attack on his "Middle" horizons. My failure to do this has contributed to the present confusion. I should have stated forthrightly that the evidence from the second season's work was in sharp disagreement with his conclusions as to the division of the Middle phase into two parts, and that Weiant's definition of the culture horizons was, from my evidence, wrong. Had I done so, I wouldn't have to say it now.

If we analyze the features of Weiant's "Middle A" horizon which he claims are unique to that member of his series and therefore set it off from the succeeding "Middle B," the distinctiveness of the level vanishes. He states (Weiant, 1943, pp. 122-3) "the pottery of this level (i.e., "Middle A") includes four wares not found in other levels: Brown, Polished Gray, Red-and-White Incised, and Striated with white slip." His "Brown ware," as comparison with his ware descriptions shows, is a selected sample of the Coarse Paste Brown wares which actually occur throughout the occupation of the site, and is not a distinct ceramic type at all. This is of course a pitfall which the technique of culling materials in the field without adequate study of ranges and variations of the real types can so easily lead. With a sizable sample containing normal ware frequency from any level of the site, one can lay out series of sherds which will grade by well-nigh imperceptible degrees in slip color from one to another of all the "wares" Weiant describes by names referring to one or another brownish or reddish-brown color in which the paste contains aplastic materials. The significant thing that unites these into a single class, in addition to the wide range of brownish slip tones, is the paste-type, which is coarse, with considerable amounts of aplastic, usually from poorly to moderately well-fired, and, apparently because of the type of clay used and firing technique, did not ordinarily lend itself to thin-walled construction. There is no evidence that this particular variant of the Coarse Paste Brown wares that he designates "Brown ware" is any more abundant in the lower layers of Middle period remains. Much the same applies to Weiant's "Striated with white slip." This is a variant of the category I designated "Unslipped ollas," in which, during the entire Tres Zapotes occupation, a small proportion of vessels were given a thin wash, varying in color from near-white to tan or buff (Drucker, 1943, pp. 73-74). There is actually no indication that there was any pronounced trend toward higher frequency of whitish washes in any level. Vessel form, in this ware, particularly variations in type of neck, and use of lugs, handles, etc., is more diagnostic temporally than any color variation; certain forms and attachments are restricted to Upper Tres Zapotes horizons. The "Polished Gray ware" to which Weiant refers I am unable to identify from his description. I suspect it is actually Black ware from which the slip has eroded. Weiant and I have both noted the fact that some examples of Black ware are made of a hard gritty paste (Weiant compares its texture to that of pumice) of gray color. The case is slightly different as regards the "Red-and-white Incised ware." The few examples recovered in 1940—there were 7 all told, 3 from trench 1, and 4 from trench 13—did come from the lower halves of the Middle phase

deposit of those trenches. Weiant does not state how many sherds of this variety he collected, but he definitely did not have many (the "Dichromes" which he lists as comprising an estimated 2% of the "general Ranchito collections" are quite different and do not include this Red-and-white), as comparison with his table of color combinations shows (Weiant, 1943, pp. 56-57). I regarded the Red-and-white sherd-type as a cultural sport—a sort of premature interest in color that failed to capture the imagination of the potters of that day. It is obvious that 7 sherds out of a lot over 12,000 from the Middle phase are insufficient for the definition of a separate sub-period.

Weiant's "Middle B" phase elements similarly do not fit the stratigraphic evidence too well, for it may be noted that they include "effigy handles" (the same appendages to which I applied the awkward name "vertical modeled lugs"), "Xipe heads," "figurines of Teotihuacan type," and "limbs of jointed dolls," all of which can be demonstrated to have been consistently restricted to Upper Tres Zapotes.

It is possible to bring evidence from a related site to bear upon this point of the basic unity of the Middle Tres Zapotes phase. As was brought out in a brief preliminary paper (Drucker, 1947), La Venta was intimately related ceramically (and in art and presumably its whole culture), to Tres Zapotes. Moreover, La Venta is a one-horizon site, and that horizon can be demonstrated on ceramic grounds to have been the equivalent of Middle Tres Zapotes (there are reasons for assuming that the Middle Tres Zapotes patterns lasted slightly longer at La Venta; that is, there was a definite lag before it was affected by the cultural influences producing the distinctive characteristics of the Upper phase. This however does not affect the present problem). Study of the stratigraphic materials from La Venta revealed no indications of any break or abrupt change in pottery wares or styles that would justify subdividing the phase. Middle Tres Zapotes-La Venta was a single horizon, in which nothing broke or interrupted the continuous internal development of its ceramic patterns. This is offered here as a flat statement; proof is to be found in the detailed report on La Venta, the *ms.* of which lacks only a section on the 1943 excavations that I have been trying to cajole Wedel into writing since I returned to Naval service in 1948. I perhaps should add that by the time I worked over the La Venta collections I had more experience with Mesoamerican ceramics under my belt—still a novice, but not so much of one as when I worked on Tres Zapotes. (It seems worth adding that another point of disagreement between Weiant's report and mine, that relating to the ceramic composition of the Upper phase, was checked in 1940 at another one-horizon site, the small but rich site of San Marcos, near Tres Zapotes. Collections made from testing the shallow deposits there check item for item with my Upper phase inventory from the Tres Zapotes trenches, and do not include one scrap of Soncautla material, thus corroborating the separateness of these complexes.)

In short, all the evidence, when critically reviewed, indicates that the Middle phase at Tres Zapotes was a continuum, with gradual development and change in ceramics, but no break whatsoever. Weiant's division of it into "A" and "B" subphases is not in accord with the facts. What this means, in terms of Wauchope's synthesis, is simply that the Tres Zapotes (and the La Venta) region—the Olmec area, as I prefer to call it—was culturally isolated during this time, pursuing its own trends in ceramics in response to internal stimuli only. The Proto-Classic patterns never reached it, so that in effect, the culture jumped from a prolonged Urban Formative into a full-blown Classic pattern. As pointed out in the Tres Zapotes report, the sudden appearance of a host of the new elements that distinguish the Upper phase very forcibly suggests the sudden opening up of new lines of cultural influences, after a period of isolation.

On re-reading these paragraphs, I find they sound sharply critical of Weiant's work. I have no intention to be harsh or unfair. My opinion is that Weiant's conclusions as to phases and sequences at Tres Zapotes are in error; I further believe that his errors stem from the methodological mistake of attempting to carry his analysis of his materials beyond the limits imposed by his field-methods. He excavated and kept his records using a reconnaissance-type approach, not a stratigraphic one. He could not, therefore, derive conclusions as to stratigraphy from his materials. The danger of the perpetuation of errors made in this fashion has been demonstrated in Wauchope's study. This note is intended to clarify the matter of the Tres Zapotes sequences, and to offer my apologies for not having cleared it up explicitly in my original report.

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May, 1951

NEOLITHIC FIND IN THE CHŬKCHI PENINSULA

In the summer of 1947, Levoshin (1950) found a group of objects on a terrace of the Yakitikiveem River in the central part of the Chukchi (Chukotski) Peninsula (approximately 66° N., 175° W.), which forms the Asiatic shore of Bering Strait. These objects are as interesting for their typology as for their geographic location. The announcement of the find had been foreshadowed by Beregovaya (1948), where reference was made to an oral report by Okladnikov. In this report, Okladnikov had referred to a Neolithic station in the valley of the Amguema River in the Chukchi Peninsula. Shimkin (1949), in a recent review of Soviet anthropology, has made note of the discussion to that point. Now, the brief communication by Levoshin, and a further comment by Okladnikov (1950) himself help to bring the information on these finds up to date. It is almost certain that the Amguema Valley reference is the same as the Yakitikiveem River site reference. Yet, while existing maps show the Amguema River as emptying into the Arctic Ocean in the Chukchi Peninsula, the Yakitikiveem River is not reported on any known map or chart.

The finds were located on the surface of a terrace above the river; unfortunately the height of the terrace above the river was not given. The finds consist of nine stone implements (Fig. 85). In association with them was an accumulation of decomposed bone. According to Levoshin, one of the bones, possibly belonging to a "not very large animal or to man . . ." had retained its original shape. But it was destroyed on light contact, before it was photographed or sketched.

The following is Levoshin's desciption of the objects found:

1. Fragment of knife-like blade, 3.8 cm. long, 1.3 cm. maximum width, 0.6 maximum thickness; both edges sharpened.
2. Spear point, 6.7 cm. long, 2.3 cm. maximum width, 0.7 cm. maximum thickness; lower part broken off.
3. Fragment of flint with traces of working, 3.6 cm. long, 3.0 cm. wide.
4. Same as no. 3, with sharpened edge, 4.5 cm. long, 3.2 cm. wide, 2.0 cm. maximum thickness.
5. Fragment of flake for an arrow head, 2.3 cm. long, 1.3 cm. wide at lower end, 1.0 cm. wide in middle.
6. Fragment of bone, not preserved. (Not shown in figure.)
7. Flake, 4.0 cm. long, 2.2 cm. wide, 2.0 cm. maximum thickness; one surface has longitudinal fluting 0.3 to 0.8 cm. long, four in number.
8. Fragment of an arrow head, 1.6 cm. long, 0.9 cm. maximum width, 0.15 cm. thick; longitudinal fluting on one surface, 0.4 cm. long.
9. Fragment of a large arrow head (?), 2.9 cm. long, 1.3 cm. maximum width, 0.5 cm. maximum thickness.
10. Fragment of a spear point, 2.5 cm. long, 1.1 cm. maximum width, 0.5 cm. maximum thickness.

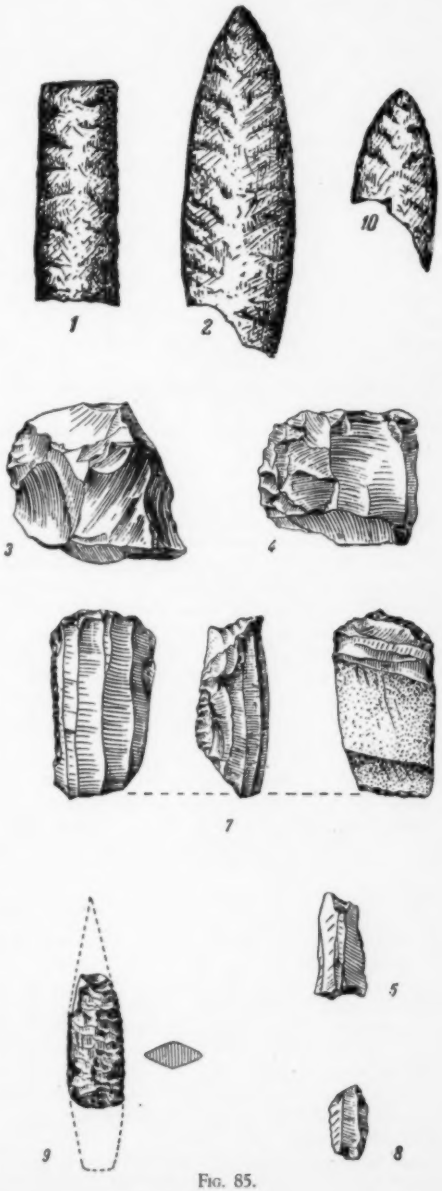

FIG. 85.

The flint in all cases is of a light-grey color, but some also have colored layers, of bluish, yellow, or buff tints. The rock is not indigenous to the region.

Okladnikov adds further typological details in his accompanying comment: The projectile points (2, 5, 8, and 9) comprise one group. No. 9 is a fragment of a large elongated point, with both edges convex, and lenticular in section. Both surfaces show signs of retouch, with narrow facets of careful workmanship that appear to continue around the working edge to the opposite surface, the working edge thus being sawlike in form. Nos. 2 and 10 are similar; no. 10 is the upper end of a broader point than no. 5; no. 2 is a large point, almond-shaped, with a pointed tip. No. 1 may have been worked for hafting, with both surfaces retouched. He further states that similar knife-like blades, together with nuclei, have been found on the Kolyma River (67.30° N. and 158.30° E.). He also compares no. 5, an arrow head, to a find by M. G. Levin on Ol' Island near Magadan (59.34° N. and 151° E.). In general, Okladnikov has postulated the existence of a nomadic Neolithic hunting population along the Lena and Kolyma Rivers. The Levoshin find is the earliest trace of man on the Chukchi Peninsula, and the first find in the interior of the peninsula. In Okladnikov's opinion, the Neolithic on the Chukchi Peninsula cannot go farther back in time than the last five centuries B.C. He is presumably arguing on typological grounds.

I should like to turn now to some broader implications of this find. Typologically, the implements are part of a north Eurasian Neolithic complex, especially as regards the workmanship of the blades and points. This complex is believed to date at the earliest to 2000-1500 B.C. (Foss, 1947, 1948) in North Russia, and to be somewhat later in Kamchatka (Rudenko, 1948). The techniques also have a generalized resemblance to Ipiutak blades and points (Larson and Rainey, 1948). It may be possible to speak of a circumpolar Neolithic, as a result. In any case I should like to throw these questions open to discussion.

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A FLUTED POINT FROM CENTRAL BAJA CALIFORNIA

In November, 1949, a fluted point was found in possession of a family at San Joaquin in Baja California. It was not possible to procure the point or photograph it, but a drawing was made. The drawing is accurate as to scale, form, and extent of fluting. The individual flake scars are illustrative rather than an attempt at exact representation. The point seemed to be made of very fine grained, almost glassy, basalt and the flake scars are considerably worn (Fig. 86).

San Joaquin is located about ten miles south of San Ignacio in latitude 27° 12′, close to the center of the penipsula, but in the lowlands which drain toward the west coast. It is in a small arroyo with a permanent spring capable of irrigating gardens some thirty acres in extent. The place appears to have been occupied by a Cochimi *rancheria* at the time of first European contact early in the 18th century, and a *pueblo de visita* for the Mission San Ignacio was established in 1729 or

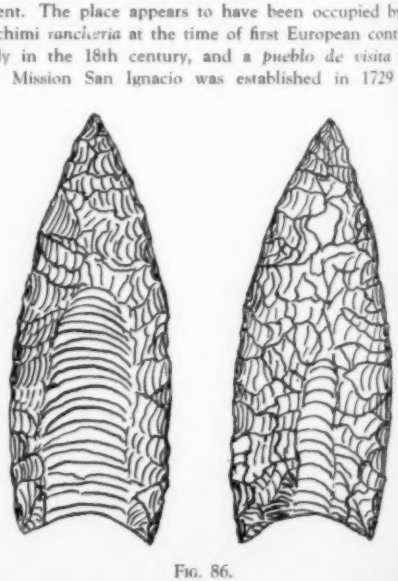

Fig. 86.

shortly thereafter. A population comparable to the present one, which is about fifty persons, has occupied a portion of the area around the spring throughout historic time. The presence of a permanent supply of potable water in a region where the average annual rainfall is less than four inches constitutes a strong attraction for human settlement. As long as the climate of the central part of the peninsula has resembled the present one, this locality is likely to have been occupied during at least part of the year, by members of any population living in the general area.

The point was reported to have been found a few years ago by a local resident on a sandy terrace in the arroyo bottom just a few yards north of the spring, and directly opposite the present settlement. This sandy terrace is 100 yards long and averages 30 yards wide. It is subject to inundation by the floods which may occur once in 10 to 20 years. Some of the minor mission buildings were constructed on this terrace; there is a great deal of worked stone in the sand; some hearths can be identified and there are some manos and pieces of metates. The terrace may well have been the favorite Indian campsite. Worked stone of material similar to the fluted point is present as well as chips of obsidian and chalcedony. All these types of rock exist in the mountains a few miles to the east, though no Indian quarries have been identified. Complete points of types more common in central Baja California have been taken from the terrace by the local people from time to time. Because of the periodic flooding and the fact that the sand is subject to continuous movement by the wind, it is improbable that any stratigraphy can be worked out for the terrace, though it unquestionably has been occupied for a long time.

The point closely resembles one from Dent, Colorado, illustrated by Wormington (1949, Plate 9, right). This find extends the known occurrence of fluted points into an entirely new area. The closest finds of fluted points known to the writer are from Lake Mojave in eastern California (Simpson, 1947) and at the Chiricahua site in southern Arizona (Sayles and Antevs, 1941). The Baja California peninsula is accessible only from southern California or the Colorado delta, and is remote from the Valley of Mexico, the locality of the only other fluted point reported from Mexico (De Terra et al., 1949, pp. 70-71). In terms of the situation in which it was found, the point could have been found where left by its maker, washed down from farther up the arroyo, or brought to the San Joaquin campsite by any of the subsequent occupants. There is no record of movement, either of persons or trade goods for distances of more than a few score miles among the Baja California Indians, and it seems unlikely that this point could have been carried as a trade piece over the more than 600 miles separating its occurrence from that of similar points.

Campsites exist at many localities in central Baja California where now there is not likely to be any water, even in part of the year. Their presence suggests human occupance of the area at times when different climatic conditions prevailed.

In other localities where it has been possible to associate fluted points with mammal bones, the association has been with bones of large grazing animals. The historic inhabitants of central Baja California and most of their predecessors, on the basis of the sites they occupied and their stone work, appear to have been concerned primarily with vegetable and littoral resources. The present flora of the region is entirely incompetent to support large grazing animals, though remains of bison, camels and horses have been collected from what appears to have been a Pleistocene marsh near the mouth of the Arroyo Comondu, about 100 miles south of San Joaquin (Massey, 1947).

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A FLUTED POINT FROM LONG ISLAND, N. Y.

Although fluted points are not very numerous in New York, it was there that they were first recognized as a distinct type under the name of "Seneca River Points" (Beauchamp, 1897, p. 21, Fig. 13, 14).

The majority of the New York finds have been in the central section of the state and along the shores of Lake Champlain and Lake George. A search of the literature, and correspondence with both professional and amateur archaeologists, has revealed no known finds of fluted points closer to the coastal area than one at Colonie in Albany County, New York. This was of an exotic quartz (Ritchie, 1951, personal communication). Therefore the finding of a fluted point in eastern Long Island extends the known range of the type.

The point illustrated (Fig. 87) was found in 1923 by Roy Latham of Orient, Long Island, on the Wickham farm, Pipes Neck Creek, Greenport, L.I. It is still in the Latham collection. It is 59 mm. long, 29 mm. across the base, and 9 mm. thick. The base and the edges for 20 mm. towards the tip are heavily ground. Above the grinding the edges are thin and sharp with a very fine retouch. The flute on the numbered face is double,

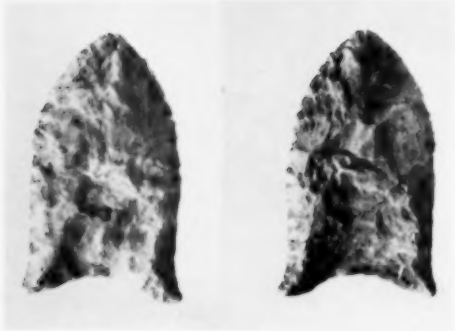

FIG. 87.

this being particularly noticeable at the base, and extends only half way to the tip. On the other face the channeling was done by a single flake extending two-thirds of the way to the tip. The material is exotic on Long Island; it is a chert, mottled bright chestnut on a cream white ground.

Geographical features make it most probable that the early hunters who made these fluted points, first reached Long Island at its western end. They should have left traces of their progress eastward to Greenport. The author would appreciate learning of any other finds of fluted points on the island.

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A FLUTED POINT FROM COSTA RICA

In 1903 C. V. Hartman excavated archaeological materials in Costa Rica for Carnegie Museum and also purchased several local collections. In June 1950 the unpacking of a portion of the collection not reported by Hartman (1907), disclosed a fluted projectile point of dull black flint (Figs. 88, 89) with these measurements: length, A to B, 58 mm.; width, C to D, 32 mm.; maximum thickness, 5 mm. The point was made from a curved flake so that one face exhibits the fluting while the other retains the smooth, unworked original surface. The sides of both faces exhibit carefully controlled secondary chipping. The basal edge and the edges from C and D toward the base have been smoothed, either by intentional grinding or by the wear of successive rehaftings. Basal thinning is pronounced on both faces. The removal of a thin channel flake resulted in a slight hinge fracture which can be seen betweeen C and D.

FIG. 88.

The specimen bears a number, but the data which accompany it are minimal. The collection catalog reads: "Objects from the Pacific Coast [of Costa Rica] . . . . Velasco collection obtained in San José . . . . Accession 2438 . . . . 43. Arrowhead [length] 5.9 cm." Accession 2438 was purchased by Hartman in San Jose in 1903 from Padre José Maria Velasco. The packing case containing this specimen appears to have been opened only twice since it was received at the museum in 1904; first, about 1915 when the specimens were numbered by a Mr. Jones, assistant in archaeology, and second, in the late 1930's when the present curator checked the contents of the box. Since this particular point is not illustrated either in the catalog or in any of Hartman's publications there may be some reasonable doubt as to its absolute association with the Costa Rican material. This question, however, would scarcely arise were the point of a type previously reported from Central America.

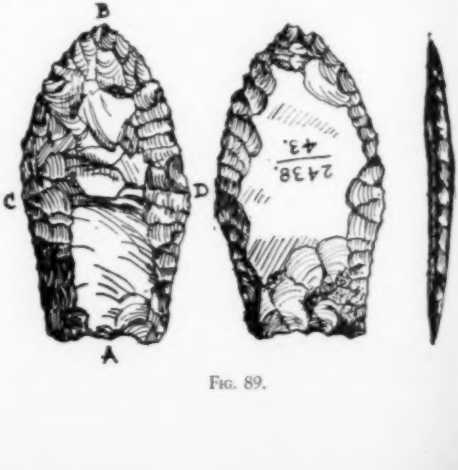

FIG. 89.

The fact that the collection came to the Museum from Costa Rica in 1904 and has only been unpacked twice since then makes the possibility for intrusion very unlikely. Nor can we expect Hartman to have noticed this particular "arrowhead" or given it special significance in view of the fact that Folsom points were not recognized until 1926.

One point, even if completely documented, is slim evidence upon which to postulate a late Pleistocene culture in Central America. This point, however, with fluting diagnostic enough to suggest a temporal and cultural relationship with the Folsom complex of the western United States indicates the desirability of intensive search for remains of early hunters in Central America. Systematic exploration has been highly productive in South America (Bird, 1943), in northern Meso-America (De Terra, 1949), and should be equally rewarding in Central America.

The suggestion, thus, is for an early culture in Costa Rica that is rather directly related to a North American early culture. The concrete evidence for this is admittedly weak and purely typological, but it is the first shred of evidence in that direction.

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ARCHAEOLOGICAL SITES ON OPPOSITE SHORES OF THE GULF OF CALIFORNIA

In 1946 Gifford published a brief account entitled "Archaeology in the Punta Peñasco Region, Sonora" (*American Antiquity*, Vol. 11, pp. 215-21). Subsequently we both spent considerable time examining sites in the region, upon which we purpose to publish once we have a Carbon 14 date for the prepottery horizon.

In January, 1951, we examined sites in the vicinity of San Felipe, Northern Territory, Baja California, across the Gulf from Punta Peñasco. There we found numerous sites similar in type to those of Sonora. They were situated on dunes and terraces of the desert coast. All were marked by the presence of shells and potsherds. The former were largely of the species found in Sonora, the latter of undecorated "Yuman" type, both of Mountain and Desert styles as described by A. E. Treganza in his paper entitled "An Archaeological Reconnaissance of Northeastern Baja California and Southeastern California" (*American Antiquity*, Vol. 8, p. 158, 1942).

With no continuous supply of potable surface water, the problem is posed as to how people lived on these sites, where the abundance of molluscan remains suggests either a fairly numerous population or a scant population occupying the sites over a long period. Our opinion is that wells were dug, as is done today behind the coastal sand dunes at San Felipe, and as the Californian Kamia of Imperial Valley and Cahuilla of the Salton Sea region formerly did (E. W. Gifford, The Kamia of Imperial Valley, B. A. E. Bull. 97, p. 9, 1931; A. L. Kroeber, Ethnography of the Cahuilla Indians, University of California Publications in Archaeology and Ethnology, Vol. 8, p. 31, 1908).

Strengthening our theory that dug wells were the source of water was the finding of living examples of *Olivella undatella* in the beach sands of San Felipe Bay and neighboring Ensenada Blanca. This species was used for beads in Cahuilla territory in prehistoric times and suggests trips to the Gulf Coast or trade with Indians who had access to the coast. Contact which brought about the transmission of the shells to the ancient inhabitants of Cahuilla territory may likewise have resulted in dissemination of the knowledge of well digging. In other words, by implication well digging probably prevailed over a considerably wider low-lying desert region than has so far been reported in ethnographic accounts.

On the San Felipe sites no artifacts of shell or bone were seen. Stones, probably used for breaking the shells of *Phyllonotus nigritus*, were common. Some showed traces of fire. Also small manos and fragments of what were possibly metates were seen, stones for both being readily selected from the countless suitable beach cobbles. One fragment of obsidian and several of jasper were seen. No projectile points were observed. Possibly the aborigines used wooden-pointed arrows as on the lower Colorado River.

One species of barnacle (*Tetraclita squamosa*) and the following species of mollusks, largely duplicating those found in the Punta Peñasco region, were observed, often with evidence of fire, in the kitchen middens of the San Felipe region: *Acanthina angelica, Arca pacifica, Cardita affinis californica, Cardium elatum, Cardium procerum, Chama buddiana, Chama frondosa mexicana, Chione fluctifraga, Crucibulum imbricatum, Dosinia ponderosa, Glycimeris maculata, Oliva incrassata, Ostrea, angelica, Ostrea palmula, Paphia grata, Phyllonotus nigritus, Polinices recluzianus, Pteria peruviana, Solenosteira anomala, Tagelus californianus, Tegula mariana, Tegula rugosa, Turbo fluctuosus, Volsella capax.* We are indebted to Dr. Leo G. Hertlein for the above marine-invertebrate identifications.

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INCISED SLATE FIGURINES FROM KODIAK ISLAND, ALASKA

In a brief article on the Cape Alitak petroglyphs of Kodiak Island (Heizer, 1947), two incised slate tablets were shown and analyzed with the intent to suggest a relationship in the treatment of the face on the slate pieces and the pecked petroglyphs. The two flat incised slate pieces referred to above came from the Uyak Bay site excavated by A. Hrdlicka in 1931-1938. No similar specimens had been published, and so far as could be determined, they were unique examples of incised art.

Recently Mr. Donald Clark of Kodiak City kindly sent to me for inspection a series of 25 closely similar slate pieces, of which 17 are shown in Fig. 90. They range in thickness from 2 to 6 mm., and are variable in outline. Some are incised on both surfaces, but the majority have the lightly incised lines only on one face. They are made of natural flat slate beach pebbles which can be found all over the island. The pieces shown here are from the vicinity of Kodiak City.

Larsen and Rainey (1948, p. 122, and Figs, 29, 38*a*) call attention to similarities in the treatment of the face and its features between the Kodiak Island petroglyphs and certain Ipiutak engravings. They rightly argue for a relationship between the petroglyphs of Cape Alitak, Kodiak, and those from southeastern Alaska and British Columbia, a point which I have made independently (Heizer, 1947). If, as seems possible, the Ipiutak schematic engraved faces, the Kodiak Island incised slate tablets and pecked petroglyphs, and southeastern Alaska—British Columbia petroglyphs are three links of a chain, I would still argue that the Kodiak evidence indicates this connection as later in time than Larsen and Rainey (1948, Table 2) assign to the Ipiutak culture. The Kodiak petroglyphs seem late, as do the incised slate pieces which come from the upper levels of stratified sites or from known recent sites.

At this moment, the unusual incised slate tablets which portray humans, appear to be a distinctive feature of the later prehistoric Kodiak Island culture.

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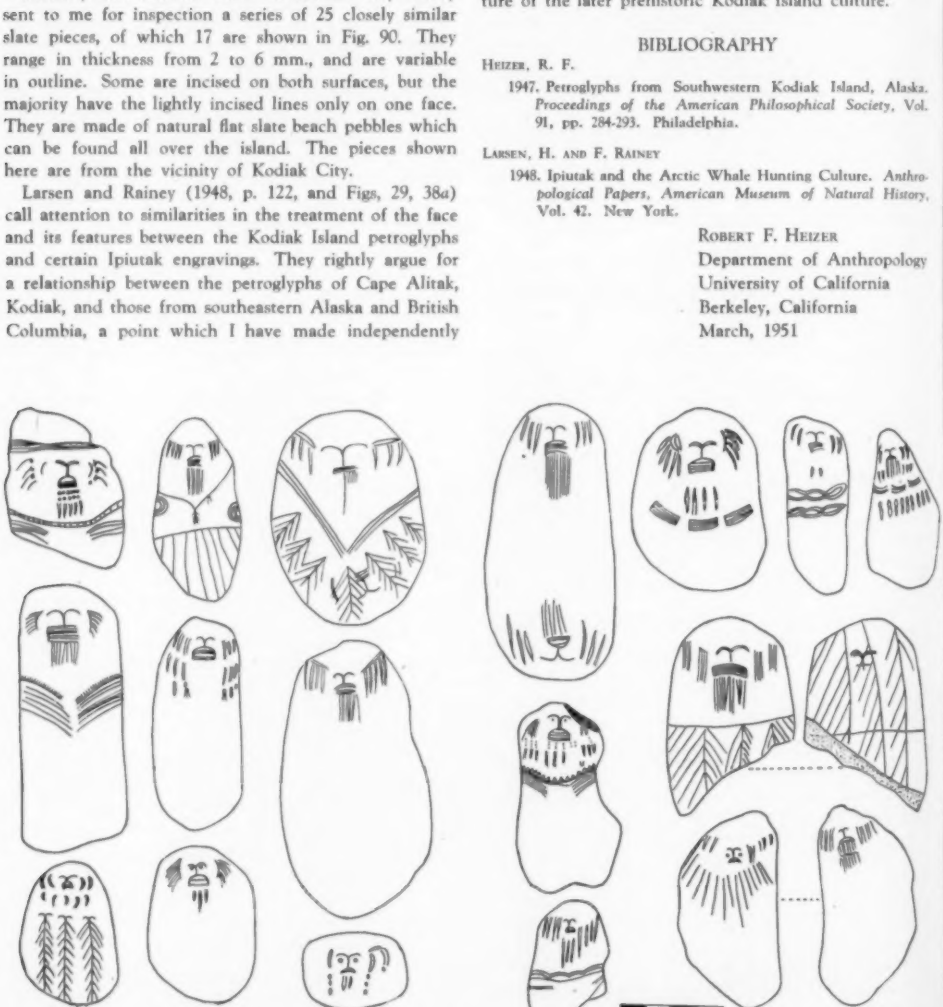

FIG. 90.

BOOK REVIEWS

The Babocomari Village Site on the Babocomari River, Southeastern Arizona. CHARLES C. DIPESO. Amerind Foundation Publication No. 5, Dragoon, Arizona, 1951. xii+248 pages; 76 plates, 49 figs.

This is the seventh publication based on the Amerind Foundation's excavations in southeastern Arizona, and it continues the descriptions of the culture of that marginal Hohokam-Chihuahua-Mogollon Area begun by this institution. This is a well organized, well illustrated and completely documented report on the results of two seasons' excavations by the author. The information in this report should satisfy any student of Southwestern archaeology who may desire to compare the material culture of another area with that of southeastern Arizona at this period (1200-1500 A.D. and possibly later). The use of pen and ink drawings as well as photographs of parts, and of entire houses, coupled with the complete documentation of each house, is most welcome and a system which could well be followed by other workers in the field.

In describing the artifacts found at Babocomari village, DiPeso divided the descriptions into four categories: 1. Use; 2. Manufacture; 3. Classification; 4. Distribution. This method, which, if longer than some other methods, does have the advantage of clearness and will be of aid to others who may want to compare their findings with DiPeso's. The actual descriptions are in outline form and easily found. This holds true for his chapters on architecture, as well as on the arts and crafts.

The descriptions of the material found during the excavations are amply and clearly done. One has the feeling that the excavations as well as the analysis were made with care. The material uncovered at Babocomari is of interest to the student of the southern section of the Southwest and northern Mexico, for there is at this site a combination of traits from neighboring regions into a culture that cannot be described as typical of any one of the other areas.

In the comparison of each trait found at the Babocomari village with similar traits from the other culture areas found in the Southwest at this time level (1200-1500), the majority are most closely related to the Hohokam area—and these traits are often the important and diagnostic ones, such as burial practices and methods of manufacture of the pottery, etc.

The houses found at Babocomari village — which DiPeso has divided into three types (a) secular, (b) ceremonial, and (c) women's house, are puzzling. The early Papagos in Arizona had three different types of houses which can be divided into the same three categories. However, the Papago houses differ in many respects. The Babocomari village houses resemble somewhat those to be found to the southeast in Chihuahua and are like the houses found to the north and west at the Tanque Verde village near Tucson. DiPeso says: "It is the author's belief that the Babocomari Village represents either the northwestern margin of the Chihuahua Culture, or an early variant of the Pima Proper, i.e. Lower Pimas, rather than a late Salado site."

DiPeso is probably correct in saying that the village does not represent a late Salado site, for the weight of the evidence from Babocomari certainly proves that the Salado people had not entered that area, but rather suggests that the closest relationships were with the Hohokam area to the northwest. The culture shows less connections with the culture of the Chihuahua area than with any other, in the opinion of the reviewer. Therefore, it would seem likely that the architecture and village lay-out may well be a variant of the Lower Pimas (Late Hohokam?), showing the expectable connections with the adjoining area, rather than an idea borrowed from, or brought into the area by a group of people whose connections were with Chihuahua.

The reviewer does not agree with DiPeso when he says the houses are basically similar to the Chihuahua houses. If one studies the reconstructions of the three major types of houses found at Babocomari village, one sees that the walls are not the main support for the roof. The roof is supported primarily by the posts and the walls are built to enclose the sides. These houses are merely enclosed ramadas; enclosed in type (a) by puddled adobe walls and in type (b) by reed matting. Typical of Pueblo and Salado construction is the use of the wall as the support for the roof beams. This is a fundamental difference in the manner of building and may prove to be one of the differences between Hohokam and Pueblo type houses.

The two major types of houses found at Babocomari are built in the Hohokam manner. The use of puddled adobe walls in type (a) may be an idea adopted from the Salado, or it could be something that developed independently in this area. The former is probably the true answer, for certainly other Salado ideas were entering the desert area at this time. That these are two basic methods of building, with (1) a post supported roof being the Hohokam method and (2) a wall supported roof being the late Pueblo and Salado method is an hypothesis being proposed by the reviewer in a forthcoming paper.

Turning to the Chihuahua area, Sayles (An Archaeological Survey of Chihuahua Mexico. *Medallion Papers*, No. XXII, Gila Pueblo, Arizona. 1936) shows many pictures of roof beams in the walls of cliff houses, and Kidder in the *Pendleton Ruin* report makes no mention of wall posts, merely saying that an occasional post hole was found and suggesting that these were used to support sagging roofs. Chihuahua buildings seem to have been built in the Pueblo and Salado style, rather than in the Hohokam manner found at the Babocomari site.

When considering the pottery, DiPeso says that "the Chihuahua area ceramically influenced the Babocomarite potters in design elements." Further on in DiPeso's description of Babocomari Polychrome, he says, "There was very little trade pottery coming in from

that area [i.e., Chihuahua]." The strongest influences were from the Tucson area to the northwest, or the Santa Cruz area to the south and west. Both are peripheral Hohokam areas. Babocomari Polychrome is finished by the paddle and anvil method, slipped, and then polished. Chihuahua pottery is made by the coil and scrape method of manufacture as is Salado, Mogollon and Anasazi pottery. DiPeso says that Babocomari Polychrome is probably derived from Santa Cruz Polychrome, and that both types may come from Chihuahuan sources.

In all probability Santa Cruz and Babocomari Polychrome are variants of the same ware, differing only in that Santa Cruz Polychrome lacks mica particles in the paste and the slip tends to have a crackled appearance. Both are slipped, cream colored pottery decorated with red and black paint in banded rectilinear patterns. That there is a similarity between late Chihuahua Polychrome and both Babocomari and Santa Cruz Polychrome is not to be doubted, but how much of this was an influence from Chihuahua is uncertain. Perhaps both the Babocomarites and the Chihuahuans were merely copying the coloring of the Salado polychrome ware, or perhaps both were carrying on the old polychrome tradition of the northern Sonoran area, including Trincheras Polychrome, Nogales Polychrome, and Santa Cruz Polychrome and its variant Babocomari Polychrome. These all are finished by paddle and anvil and then polished or slipped and polished. They all show many close connections in color, paint and design.

The use of the paddle and anvil in the finishing of coiled pottery is an old Hohokam technique. The polishing of the pottery is considered to be a Mogollon technique of some antiquity in the San Pedro area. Both paddling and polishing had been used in making local pottery types in this area in earlier times. Here, then, is the combining of various elements typical of different cultures into a new whole that differs from that found in any one of the other cultures. This is what one would expect in an area peripheral to cultural centers such as the late Hohokam of the Gila and Santa Cruz River valleys, the Salado of the middle Gila, and the Chihuahuan of northern Mexico.

To say, as DiPeso (p. 22) does, that Babocomari village might represent the northwestern margin of the Chihuahua culture, or, as he says later on (p. 217), possibly a peripheral group of the Chihuahua area, seems misleading. He exhibits a number of doubts himself, and can show few connections of real importance between the two areas. The above discussion is not to be considered as a definite criticism, but rather as a differing interpretation of the material. There are, however, two major criticisms which should be brought out.

Nowhere in the report does one find a chart comparison of the traits typical of the two phases which the author has described, nor is there any summarizing attempt to correlate all of the material culture found at Babocomari with that found at the nearby Tres Alamos site (Tuthill, Carr, The Tres Alamos Site on the San Pedro River, Southeastern Arizona, *No. 4 Amerind Foundation Inc.*, Dragoon, Arizona. 1947) in the San Pedro Valley. This site, the final phase of which is dated at the same time (1200-1450), was excavated and reported on by the Amerind Foundation. Lists of this type would have real value to any student, and would have completed an otherwise excellent analysis of the material.

The other major criticism is the inadequacy of the summary and the discussion of the recovered material. The two-and-a-half page summary might well have been included in the introduction, where it would have given the reader some idea of what was to come. The discussion is so scattered throughout the entire report that to understand the site as a whole, and its relationship to other areas, one must study the entire report—a somewhat time-consuming job.

The Amerind Foundation is trying to reconstruct the entire prehistory of the San Pedro River area. This report gives us one more link in the chain of events in that valley. It has shown that the Salado were not south on the San Pedro River or at least not at the Babocomari site. The report also shows that the people who built and occupied the village had many traits which were similar to those of the Classic Hohokam; some similar to the late Salado and northern Sonorans; and that they had a few connections with the Chihuahua area.

Mr. DiPeso and the Amerind Foundation are hoping to solve some of the problems opened up by the Babocomari excavations by working at a site which is thought to be one of historical record not far from Babocomari village.

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Yuman Indian Agriculture: Primitive Subsistence on the Lower Colorado and Gila Rivers. EDWARD F. CASTETTER AND WILLIS H. BELL. University of New Mexico Press. Albuquerque, May 1951. 288 pages, 5 maps. $6.00.

This work presents a picture of the subsistence pattern of the Yuman-speaking tribes of the lower Colorado River and Gila River, mainly stressing agriculture, in relation to their environmental and cultural surroundings. The authors' data, based on about one month's field work each year from 1937 through 1941, are supplemented by documentary evidence abstracted from early historic journals pertaining to Southwestern explorations as well as from contemporary sources.

After a description of the country concerned, the rivers and their relation to flood and irrigation farming, and climate and its relation to vegetative cover, man is introduced in a summary of the prehistory and early history of the lower reaches of the two river systems. The writers point out that little has been published on the archaeology of the area, and they present the ideas of Rogers, which, they observe, are questioned by some. The historic section is well documented and is con-

cerned with the Mohave, Yuma, and Cocopa, and Yuman tribes on the Gila River, principally the Maricopa.

The significance of differences in farming methods is brought out. Irrigation among the Pimans (adopted in recent times by the Maricopa) on the Gila River permitted control and two crops a year; while the lower Colorado River groups and early Maricopa on the Gila depended on spring floods for their one crop per year, often endangered by lack of a spring flood or by an excessive flood over which they had little control. Acculturation with the entry of Anglo-Americans after 1850, according to their findings, affected the native economy of those associated with the newcomers to a great degree.

Aboriginal Yuman agricultural implements are described as being more or less the same on both rivers. Aboriginal cultivated crops (maize, tepary, pumpkin, gourd, cotton), as well as those introduced by Europeans, are found to be similar in both areas, with varying degrees of dominance and acceptance among groups. Cotton, however, seems to have been rarely grown by the Colorado River Yuman groups, and cultivation of the sunflower was found to be restricted to the Mohave.

In a description of harvesting, seed selection, and storage techniques, in which the women played a prominent part, it was observed that the Yuman groups did not store food in as great quantities as the Pima and that there was no apparent storage for emergency.

To round out the picture of subsistence, two chapters are devoted to the semicultivation of seed plants, which is a unique trait of the River Yumans, and to the wild plant and animal products on which these people greatly depended.

One chapter is concerned with the ritualism pertaining to River Yuman subsistence. The simple ceremonialism of these groups, the importance of the shaman and involuntary dreaming which created a supernatural outlook that was individual rather than formalized, the lack of legends pertaining to their crops plants, and the lack of ceremonialism directed toward rain are contrasted with the more complex Pueblo rites.

In summarizing their data, the authors agree with Spier that the Pima, Papago, Maricopa, and lower Colorado River Yumans compose a single cultural province, pointing out also that other authorities are not all in agreement. Yet they conclude that the difference between River Yumans and the Gila Pima in subsistence is attributable mainly to cultural factors. A sizable bibliography, which indicates the scope of this study, and a fairly complete index are included in the report. This publication brings under one cover a great amount of data pertaining to River Yuman subsistence, and constitutes a reference which students of the Yuman groups cannot well afford to be without.

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Here They Once Stood. MARK F. BOYD, HALE G. SMITH, AND JOHN W. GRIFFIN. University of Florida Press, Gainesville, 1951. 189 pp., 12 plates. $3.75.

A welcome addition to the too-slowly growing bibliography of reports on excavations at historic sites, and an important contribution to the history of the Spanish period in America! Because of the similarity of subject (Franciscan missions), it is inevitable that this report will be compared with the incomparable report on Franciscan Awatovi, which places the present work in an unfortunate, and probably unfair, position.

Here They Once Stood is the work of three authors, each contributing most competently to his particular section, but the book would have profited by a "senior" author to have pulled the three parts together in the way of a general introduction and broad conclusions, rather than having each of the authors provide his own. After all, one of the real contributions of such a collaborative enterprise is the possibility it possesses of coming up with a more detailed, more comprehensive, and more correct "cultural context."

The first section is Dr. Boyd's translation of original documents dealing with Spanish Franciscan missions in northern Florida. Dr. Boyd, although a malariologist by profession, is most convincing in his role of historian and translator of Spanish documents. The translated documents are introduced by an adequate and readable introduction—adequate for his section of the book, but not for the book as a whole. It must be left to Spanish scholars to appraise the translating, but to me this contribution of Dr. Boyd's is an outstanding achievement.

Smith and Griffin each describe (and much too briefly) the archaeological exploration of a mission site. They are the first two sites of this kind excavated in that area, and provide typical archaeological data for rounding out the documented history. Descriptions of ceramic wares, both Spanish and aboriginal, are included in the Appendix, followed by a tabulated trait list. There are also the other requisites of a good report—bibliography, index, and illustrations.

The book throws much new light on the final, critical years of the "Mission Era" of northern Florida. In view of the extensive bibliography compiled by the authors, it is surprising how little actually was known, prior to this study, about the missions of the Apalachee region. Excavation of two typical sites fills in a most interesting and important aspect of this story; namely the difficult life led by the Franciscans who established their simple, crude outposts among a most inhospitable people. The whole picture of the missionary's life—his simple mission buildings and the paucity and crudeness of his material blessings—are brought out by these studies. How different a picture than the one so many of us have of the Spanish missionary following in the wake of conquering armies.

There is a world of valuable material in this book, but I found it somewhat difficult to read, which I attribute to organization rather than to the writing abilities of the authors. If I could have read Smith's and Griffin's introductory sections and Griffin's conclusions at the very outset, I would have found Boyd's documents more appetizing. This is probably because I am an archaeologist, but, in any event, the book would have profited by an over-all introduction, incorporating the type of general synthesis and statement of problems contained, or touched upon too briefly, in the two archaeological sections.

Another criticism I have of the book is that the authors leave too much interpretation for the reader. The interpretation, what there is of it, is excellent, but there could well have been much more of the sort of interpretation found in Ross Montgomery's section of the Awatovi report.

As one interested in European artifacts of the American colonial period, I would have appreciated more illustrations, particularly the sort of drawings that Kenneth Kidd did so effectively for his Ste. Marie I report.

Here They Once Stood, of course, is not an archaeological report, although an important part of it describes the results of two archaeological projects, and its real contribution probably lies in providing the translated, edited documents, and in pointing the way for further and more comprehensive collaborative studies in this field. Even though this book might have gone much further in "construction of a cultural context," in giving a full picture, it demonstrates quite convincingly that close collaboration of historian and archaeologist possesses potentialities for a fuller history than either might accomplish alone, and it gives us some of that "fuller history" which we did not have before.

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The Table Rock Basin in Barry County, Missouri. Lee M. Adams. Memoir of The Missouri Archaeological Society, No. 1, Columbia, 1950. 63 pp., 1 map, 28 figures.

The Missouri Archaeological Society is to be congratulated on the introduction of a Memoir series, which will enable the Society to present a more detailed analysis of the important areas of the state. The first issue contains excavations and survey work in Barry County, Missouri, over a ten-year period. Adams has worked along the White River as it winds through the Ozark plateau north from Arkansas into Missouri. Of some 120 Indian sites so located, five were excavated. This report covers the survey work and four of the excavated sites; the other site has been reported in the *Missouri Archaeologist* Vol. 7, No. 2, 1941. As this area is well in the region of the Ozark Bluff cultures, published data on controlled excavations is greatly needed. The first half of the Memoir deals with a description of the geological and geographical attributes and the surface material in the country. So few sherds were found by Adams that the cultural analysis of the survey rested completely on the chipped and ground stone artifacts.

The chipped stone was divided into four types. The type criteria were size, frequency, and function. Perhaps this system has its merits. There have been so many projectile type classifications proposed, and then never used except by their authors, that this system of description of each type seems adequate. The types are well illustrated so they can be used for comparative purposes. From this information a qualitative if not a quantitative comparison can be made. Type 1 includes a number of forms of points that are associated with the pre-ceramic horizon in the Ozarks. These early types are shown again in type 2. Type 3 consists of the more unusual forms. This type is not common and is usually found in a fragmentary condition. The conclusion that this type has antiquity does not seem well founded. Type 4 is the small triangular or triangular side-notched point of the upper or middle Mississippi cultures that appear late in the Ozark region.

The treatment of the rock shelters is more detailed with maps and cross-sections of excavated areas. The stratigraphic placement of the material is not given, but it is stated that none of the shelters were stratified. Again the material found is well illustrated and tends to bear out the conclusions given. The interesting feature of the Ozark shelters seems to be the continuation of middle Woodland flint forms into a later time period. All but one of the shelters contained shell tempered sherds of the Mississippi period. One shelter, Natural Bridge, contained decorated sherds of Oneota type. This pottery has been identified by Chapman as pre-contact Osage.

On a whole the Memoir is excellent in printing, illustrations both on the cover and in the article, and in the handling of the material. Fuller descriptions of the rock shelters would have perhaps aided the conclusions, but this is not a serious criticism.

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Proceedings of the Fifth Plains Conference for Archaeology. Assembled by John L. Champe. Laboratory of Anthropology, The University of Nebraska, Notebook No. 1, Lincoln, 1949. x+136 pp., 7 plates. $2.00.

Proceedings of the Sixth Plains Archaeological Conference. 1948. Edited by Jesse D. Jennings. *Anthropological Papers*, No. 11, Department of Anthropology, University of Utah, University of Utah Press, Salt Lake City, 1950, viii+161 pp., 5 plates, 8 figures. $1.62.

After a lapse of seven years the Plains Archaeological Conferences were resumed in the fall of 1947. On Thanksgiving week-end of that year the Fifth Plains

Conference for Archaeology met at the University of Nebraska in Lincoln, and accepted an invitation to meet there annually thereafter. To date the sixth, seventh, and eighth Plains Conferences have so met.

These conferences have resulted from the normal renewed activity in Plains archaeology following the somewhat dormant war years, and from the abnormal intensification of work in Plains archaeology resulting from the vast River Basin Surveys program. They were designed to bring together a large number of workers in all phases of Plains archaeology and related fields for an informal annual discussion and critique of methods, techniques, laboratory analysis and tentative results and conclusions. The tenor of the meetings throughout has been one of informal open discussion, constructive criticism, and cooperative attacks on the varied problems of Plains archaeology. The meetings have attracted excellent attendance, both in quality and quantity.

If the conferences have been of value to those working in the Plains area, the published transactions of those conferences are even more valuable. The *Proceedings* of the Fifth and Sixth conferences have appeared annually, two years after the respective meeting dates. This lapse of two full years before publication is understandable in consideration of the difficulty of recording, assembling, financing and publishing. However, it is none the less regrettable. The publications would be of tremendously increased value to those working in the area, and to the profession in general, if they could be distributed within a few months of the conference date.

The *Proceedings* are almost as informal as the meetings. The published papers are simply progress reports and symposia discussing tentative theories and approaches. In most cases they are not written beforehand nor clothed in formal verbiage. It is indeed a pleasure to see a series of publications which so effectively presents an interwoven network of ideas; a workshop if you will, concerning a given subject at a given time. The editors are to be congratulated upon the difficult task of publishing these satisfactorily, and of catching the informal "workshop" tenor of the meetings.

Mechanically, the two publications are very much alike. The format and printing in each is attractive and well chosen, though occasional unfortunate typographical errors are noted, particularly in the earlier volume. The figures in the text of the *Sixth Proceedings* are quite clear and helpful. None appear in the *Fifth Proceedings*. The plates are good in both volumes, though a few lack clarity in the later one. One could well wish for a good, general map or two accompanying each volume, locating sites, general areas discussed and areal trends.

The organization of the material follows that of the meetings themselves insofar as good continuity permits. A major difference in the two is the recording of the meetings. In 1947, no stenographic nor mechanical recording was used and the proceedings consist of only the reports given, with the accompanying discussion being summarized in introductory statements by the several symposia chairmen. In 1948, both stenographic and mechanical recording were used, and the proceedings present the reports plus the actual floor discussion. This is not a new procedure, but it is rare in archaeological meetings. It is very effective and may well deserve careful consideration for other archaeological meetings.

Each conference revolved about a central theme, and while the organization of the material is similar in each volume, the subject matter is quite different. Each volume is divided into four parts. In both, the first part is a series of reports of progress of field work. In the *Sixth Proceedings* this section also contains a brief symposium on nomenclature and terminology. The soundness of the effort to establish more uniformity in archaeological terminology was agreed upon. The application of type names to projectile points, particularly of the paleo-Indian series, is discussed and another step forward is taken in at least partial, implied agreement that type names are not only useful but necessary for lithic artifacts. The naming of types is far more difficult and dangerous with lithic artifacts than with pottery, but is none the less useful. The work of Kelley and others in Texas has ably demonstrated both the hazard involved and the usefulness of projectile point type names, and the necessity for full description of types and *ranges of variation within the type*.

Parts Two and Three of each volume are devoted to extensive symposia centering about the main theme of the respective conference. At the Fifth Plains Conference this theme was "Plains Ceramics and Pottery Typing." The reader at once sees in these papers a vigorously increased appreciation of the potentialities of Plains pottery and the necessity for typological studies. The discussions of systematics and typological procedures by Rodeck, Krieger, and Jennings are very enlightening. A number of pottery types that the various authors have established are named, defined and described. These are based largely on sherds rather than on whole vessels. Besides the named types, Champe and others describe a number of provisional types which may later show "complexes of traits which seem to be modal within a sherd series . . . [with] good evidence of the range of variation within the same series . . ." (Champe, p. 44).

Griffin's description of the Cahokia types emphasizes another major trend in Plains archaeology, i.e., the viewing of the Plains area in its areal-temporal relationships with other North American culture areas, as seen in characteristics of pottery types. Spaulding and others continue to develop this broad perspective of Plains archaeology in relation to Hopewell and other sequences. These authors are bringing together the multi-

tudes of localized site descriptions and developing chronologies, affiliations, and cultural sequences for the Plains area, the soundness of which may later be confirmed or denied by additional evidence, but which at present looks largely acceptable.

The symposium on the paleo-Indian in the central Plains, forming the final section of the *Fifth Proceedings*, is most stimulating. The trend as seen in these papers develops in three directions: (1) Discussion of basic tools applicable to paleo-Indian problems, such as the terrace concept, and index fossils; (2) review of past work, such as Signal Butte; (3) description of new paleo-Indian sites in the Plains, such as Lime Creek, Plainview and the numerous sites discussed by Bliss in the northwestern High Plains. It is significant that throughout these papers evidence continues to accumulate in support of the theory of continuous occupation of the plains area from paleo-Indian to modern times, consequently closing the "gap" between paleo- and neo-Indian.

Developing from this, the principal theme of the Sixth Plains Conference was "Climate, Environment and Culture During Post Glacial Times." Part Two of the *Sixth Proceedings*, a group of papers by various earth scientists, implements the archaeological discussions of the subject contained in Part Three. It has long been obvious to many that paleo-Indian studies, as well as studies of early or even late neo-Indian problems, require extensive interdisciplinary cooperation between archaeologists and various earth scientists, to their mutual advantage. Now, in 1948, a whole conference is devoted primarily to this interdisciplinary cooperation. Krieger, as program chairman of the Sixth Conference, is to be congratulated on this farsighted presentation.

Climate, erosion, sedimentation, terraces, loess deposits, forest sequences, fauna, and soils are all discussed at some length by men who have each spent many years on these problems and devoted no small amount of their time to the relation of these problems to human occupations. The general trend here is to view the Pleistocene and post-Pleistocene sequences not only in the light of their own localized development in the Plains but also as these sequential manifestations correlate with similar phenomena over the world. There is no dogmatic imposition of world sequences on the problems of the Plains area, but instead a deeply analytical series of suggestions as to how the Plains sequences may be strengthened by integration with world sequences. These papers are all controversial in nature and inspired some very stimulating floor discussion. It is unfortunate that Burma registered a discordant note, preferring to depart from constructive criticism in favor of vitriolic personal attack. The reader may save himself some confusion by disregarding this paper altogether.

Two excellent papers by Will and Weakly on the results of dendrochronological studies are encouraging for the prospects offered of absolute dating in the Plains, not only of sites but also of climatic events. These same men also have two very good papers on the same subject in the *Fifth Proceedings*. It is worthy of note that they are obtaining good results from cedar and oak timbers in the Plains area. The Carbon 14 method for absolute dating, rather new at the time, is outlined by Orr.

The views of several Plains archaeologists on climate, environment, and culture are expressed in the remaining articles of this section. Wedel, Hughes, Kivett, and Smith discuss the archaeological approach to the general problems with specific applications to certain sites of both early and late horizons. Holder and Wike detail the findings at the Allen site on Medicine Creek, Nebraska. Bliss' report on the Signal Butte site merits careful consideration. This, one of the most significant of the early sites in the Plains because of its position and stratigraphic sequences, was reopened by Bliss in 1948. He presents substantial evidence for the separation of Signal Butte I into at least two and possibly three periods of occupation, and concludes on the basis of deposition that the oldest level here is considerably younger than was previously suggested by Strong. A suggested general sequence of North American projectile points is ably presented by Krieger. This paper and particularly the accompanying diagram, placing varieties of projectile points in general climatic time periods, provides considerable clarification of the subject in general. One may well wish, though, that this had been extended to include other sorts of artifacts as well. Bone, antler, ground stone, and other varieties of chipped stone artifacts, somehow never seem to receive more than cursory mention in sequential studies of this kind, although much information is available on these materials.

Under the able guidance of Roberts and Strong, the final section of the *Sixth* is devoted to a round-table summary of the results of the conference. Here again the "workshop" spirit of the conference shows its merit. The material presented is extensively reviewed, questioned, and discussed, not as individual segments but as one integrated whole. It illuminates remarkably well the fundamental problems dealt with throughout the volume. No mere digest of the preceding papers, it is instead a summary of the meanings and implications of those papers. Finally, in the latter part of the summation, Plains culture sequences are again reviewed with particular emphasis on the Signal Butte material.

In sum, it may be said that these two volumes, while not in any way compendious texts of Plains archaeology, are certainly two of the most valuable contributions to the study of Plains archaeology yet to appear.

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Anthropological Records, University of California Press, Berkeley and Los Angeles, Volume 12, Nos. 1-4, 1949-1950. Comprising 12:1 *The archaeology of central California*, 1: *The early horizon*, by ROBERT F. HEIZER; 12:2 *The archaeology of central California: A comparative analysis of human bone from nine sites* by R. F. HEIZER AND S. F. COOK; 12:3 *An archaeological survey of the Yuki area* by A. E. TREGANZA, C. E. SMITH, AND W. D. WEYMOUTH; 12:4 *The Topanga culture, first season's excavation of the Tank Site, 1947*, by A. E. TREGANZA AND C. G. MALAMUD.

No. 1, the report on the Early horizon of central California is presented to make more readily available the data published by Lillard, Heizer and Fenenga in 1939. Individual reports are still planned on the 4 burial sites from which this horizon is known. Two of these sites were used only as cemeteries, the other two show slight occupational evidence. Artifact-bearing burials total 195, nearly evenly distributed among the four sites; from these the archaeological analysis was made, supplemented by a few artifacts found unassociated with graves. The four sites seem originally to have been on low raised knolls in the floor of the Sacramento Valley. Since use, the valley floor has sunken and undergone heavy alluviation.

The report is much more than a republication. A new terminology for the central California sequence is presented; the sites treated here are classified as "Early horizon, unnamed province, Windmiller facies." The line drawings of artifacts are excellent and add much substance to the descriptions. The maps lack editing: for example only 1 of the 4 sites discussed is labeled on the master map (for location of the others see map in report no. 2), and map 5 cannot be fitted to map 1, nor figure 2b to map 4 lower; profiles are scanty. There are also text sections on the functional aspects of the culture, on the exterior relationships and dating of the horizon.

The section on the economy of the culture (p. 30) advances the theory that the Early horizon people were predominantly hunting rather than seed gathering peoples, from evidence chiefly consisting of the scarcity of grinding implements in the sites. Animal bones are also scarce, judging by the short list of identifications, and one wonders if this situation has not been caused by a disinclination of these people to bury their dead with metates, rather than by a lack of grinding tools in their daily life. If the evidence for a hunting economy is well founded, an analysis of the capacity of the area in the support of sizable groups of hunters would be pertinent.

The fact that the Early horizon artifact assemblage described has been selected as burial gifts does not explicitly enter into Heizer's discussion on economy nor into the following comparative sections (pp. 34-40). In absence of such a discussion it seems possible that the relationships found between the Sacramento Valley sites and Borax Lake, Oak Grove, Topanga, and the southern California sites are in major part a function of differences between burial and habitation sites rather than true measures of regional variation. Treganza and Malamud (see review of report 4 below) differ with Heizer, who sees a lack of similarity between Topanga and Oak Grove. This disagreement questions Heizer's proposal that the ethnological boundary between the central and southern California areas can be carried back 4500 years: Oak Grove and Topanga straddle Heizer's major cultural boundary. The evidence given for considering the Oak Grove culture "a close relative" of the Windmiller facies (p. 35) is given as: prone and supine extended burials; sites [chiefly burial grounds] in locations at present unfavorable for habitation, and with the soil and its contents heavily indurated with calcium carbonate. The artifact assemblages of the two burial groups are stated to show no specific resemblance. This is slim pickings for a demonstration of cultural relationship!

But, after all, California archaeology in general allows rather slim pickings. Its progress at present necessarily depends on descriptive monographs to which this is a valuable addition. Theories on cultural interrelationships and functioning are valuable at all stages of a problem and this report includes a commendable number of them.

In No. 2 Cook, a physiologist, reports upon a series of chemical analyses on human bone from California archaeological cemeteries in an attempt to estimate their relative ages. A section by Heizer presents the archaeological background of the analyses. To estimate age Cook has computed arithmetic means from weighted percentages and ratios of constituents from the samples from each site, and found that the values thus arrived at show — with minor exceptions — the same early-late ordering as that determined stratigraphically from the archaeological contents of the graves. From archaeological age estimates of the horizons sampled, Cook has been able to hypothesize certain general characteristics of the rate of progressive chemical change in buried bone through time. A paragraph added to the text reports that analyses made later on bone from other provenience than the central California sites has given values not in harmony with the main series, suggesting that the homogeneity of soil conditions in the major area sampled may have allowed the correct ordering of the results. A later paper by Cook (University of California Publications in American Archaeology and Ethnology, Vol. 40, No. 6, 1951) substantiates this theory.

Estimations of age by determination of chemical replacement and depletion are most certainly likely to be in general, as Cook has demonstrated in this case, affected by conditions in the microenvironment. The technique would seem to have an immediate usefulness in estimating relative ages of objects found in close proximity, or under demonstrably very closely similar soil conditions, although even in such cases circumspection is indicated. Cook's papers are admirably clear and

closely reasoned; they provide a sound methodological introduction into a difficult but potentially valuable group of techniques.

The short report on the archaeology of the Yuki area, No. 3, demonstrates convincingly the value of reconnaissance techniques and surface archaeology when the region is favorable and the researchers are awake to the possibilities of the method. Northern California has been thus far rather neglected archaeologically, and reports on this area are therefore particularly welcome. An area of nearly 100 square miles was evidently thoroughly combed and 380 sites recorded. This density of sites compares not unfavorably with the Anasazi area in the Southwest. Pertinent comments are made on ecologic placement of sites; historic information and ethnology are correlated with the archaeological record. The faults of this report lie mainly in its brevity. More work is needed before a chronology can be tried, and only general typological descriptions are given. Maps and artifact illustrations are good. More surveys of this sort are needed throughout California.

The Tank site, in Topanga Canyon just north of Los Angeles, has provided materials of much value for the slowly emerging culture history of the region, as shown in AR 12, No. 4. The Tank site is unique among the excavated sites in its area so far in two major particulars, its high and seemingly peripheral physiographic location, and the depth and richness of the deposit. It contains, as do most sites in its area, both burials and midden refuse; no architectural remains have been observed. Several indications point to an early dating: the indurated nature of the deposit, the scarcity and high stratigraphic placement of projectile points, extended burials, preponderance of manos and metates over mortars and pestles, a general, but as yet incompletely defined similarity of artifact style with the southern California desert cultures which from climatic evidence are judged early. The economy of this culture is judged to have been seed gathering, on evidence of the many metates found. Treganza, in contrast to Heizer's view mentioned above, believes that many, if not all of the elements of the Oak Grove culture of the Santa Barbara area are represented at the Tank site.

The report gives a good introduction to the artifact assemblage. Maps are excellent as are artifact half tones and drawings save that an unconventional arrangement of views is confusing. Analytic and comparative sections are likely to be augmented and made specific in the final report on the site which should appear in the near future.

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The Book of the Jaguar Priest. MAUD WORCESTER MAKEMSON. Henry Schuman, New York, 1951. xi+227 pp. $3.50.

Under this title, *The Book of the Jaguar Priest*, Makemson has published an annotated translation and commentary of *The Chilam Balam of Tizimin*. The various *Chilam Balam* manuscripts, together with the *Annals of the Cakchiquels*, *The Popol Vuh*, and other lesser manuscripts, form the principal extant examples of a native, pre-Cortesian literature preserved in the native Mayance languages, in Latin script, which is deemed by some scholars to have been transcribed in part from records written in the native systems. These manuscripts are of immense significance because of the historical items which they contain and because of the unique ethnographic information, which is largely of a native character without the ethnocentric distortion of the European reports of post-conquest times. The European reports had no true feeling for the subtleties of Maya-Nahuatl acculturation present in the various native groups.

That the Mayance groups possessed a culture which represented varying degrees of synthesis of Mayan and Nahuatl elements is more or less self-evident. Both European and native sources contain positive statements as well as internal evidence to that effect, and in varying degrees the archaeology of a part of the region reflects the Mexican penetration. Tentative dates have been assigned to the penetration and the period of Nahuatl (Toltec) domination has come to have all the aspects of tight compartmentation in the minds of some students. Especially in the northern half of the peninsula of Yucatan is this compartmentation re-enforced by the archaeology which presents architectural structures more or less identical with known highland Mexican forms of Toltec architecture; there is also seen a dearth of initial series dates so great as to constitute an abandonment of the practice; and there are art representations in keeping with the Toltec architecture which suggest certain cult practices and other ethnographic detail especially at variance with Peten representations. Additionally the aforementioned manuscripts contain Nahuatl surnames, cult practices of putative Nahuatl origin, recriminations and feuds rooted in the differing Maya and Nahuatl value systems and culture concepts. Feuds were kept vigorous by certain lineages and vested interests in the political and religious structure of the culture. These facets of the manuscript material may be said to apply to all of the Mayance area identifiable with the documentary remains as well as to Yucatan.

So far as can be determined the *rationale* of most of the studies of the manuscript material has been based upon the above archaeological and ethnographic evidence. There has been no serious consideration of the possibility of common culture traits and concepts prior to the Nahuatl penetration of the area as a result of what might be called a "co-tradition" of the general Mayance-Nahuatl area. There has not been much emphasis placed upon mixed features which may have resulted from both bilateral and unilateral acculturation, and there certainly has not been enough emphasis placed upon the fact that *every single shred of ethnographic material available for the Mayance area in the manuscripts* (the only other available data are confined to architecture, ceramics, art representations, and hieroglyphic writing) *comes from sources subsequent to*

Nahuatl penetration and represents possible acculturation of one sort or another. Further, there has been little emphasis placed upon the concomitant fact that Toltec culture, the common denominator in the highland Mexican area and in the Maya area, was overlaid and obscured by subsequent highland cultures and obscured by blending with Mayan culture, so that except for the most simplistic traits and concepts the Toltec ethnography, which by subtraction would leave pre-Nahuatl Mayance ethnography laid bare, is largely unknown.

In addition to the above strictures there are certain problems concerned with the history of the Nahuatl penetration and with various types of ethnographic material which do not seem satisfactorily settled by the piecemeal, serial sort of investigation which has so far been had. Illustrative of one of the historical problems, there is some internal evidence in the manuscripts which in effect constitutes a mass of common details concerning the hegira of the Mexicans, the Quiche, and the Cakchiquel. By the inclusion of certain stereotyped phrases and details in *The Annals of the Cakchiquels*, the *Popol Vuh*, and the various *Chilam Balam*, there is also evidence concerning the "little and great descents" of the Yucatecan area, initial series dates not withstanding.

The fact that the Mexicans who settled Tenochtitlan share many common elements in their hegira stories and related mythology with the Quiche and Cakchiquel should in itself show that a "co-tradition" of respectable antiquity for the Mayance-Nahuatl area is likely, or, by assuming the latest possible introduction of the common elements we may show that the Nahuatl (Toltec) carried the tradition into the highlands of Guatemala with them and the Mexicans incorporated the tradition into their history subsequent to the time of Toltec domination of the highlands of Mexico and their departure from Tula. If the latter assumption is examined, it should become apparent that neither the Mexicans who follow the Toltecs in the Valley of Mexico nor the Cakchiquel and Quiche, the Mayan peoples whose manuscript material shows the fullest development of the hegira, neither made the migration nor originally possessed the particular set of mythic and quasi-historical themes found therein.

If either supposition has any basis in fact, then the popular serial attack upon the manuscripts such as Makemson's, wherein a single manuscript is translated and a commentary made thereon using at best a fractional part of the available, pertinent, collateral material is ineffective and will lead to more confusion than fact. Kluckhohn's stricture upon the lack of broad perspective and broad conceptual structuring of archaeological investigations in the Mayance field is certainly applicable in the field of translation and commentary of the documentary remains insofar as any ethnological findings are concerned; but, whereas Kluckhohn acknowledges the technical skill and sapience brought to the task of excavation and the reporting of detail, no such acknowledgment can be made concerning the documentary field.

It should become apparent that the solution to a correct interpretation of the documentary remains will be of a simultaneous nature when all the material, Mayance and Nahuatl, is jointly examined. Prior to such examination the material will have to be reduced through translation of a sort which will adhere as closely as possible to the original without resulting in the jargon of a word-for-word translation and will further show footnotes giving literal translations of idiomatic phrasing. Together with the translation, an absolutely *verbatim* transcription of each original manuscript should be published in type font that reproduces the special phonetic symbols found therein and a vocabulary which includes every word (both usual and variant spellings) together with a notation by page and line of each individual occurrence and all possible translations of each word together with the sources of the translations. Such meticulousness will not actually result in a much greater expenditure of time than the usual "literary" translation and would be well worth the effort as a control on accuracy as well as serve as an open invitation to professional linguists.

Obviously, such simultaneous treatment is not now possible, but the *verbatim* transcription of each manuscript, the translation thereof, and the vocabulary, can be made for each individual document. Just as obviously the reduction of the ethnographic data, without regard to cultural provenience, except for suspect European material, can and must be made prior to valid ethnological analysis by following some such structure as that used by Murdock and his associates in producing an exhaustive ethnography in cross-cultural surveys.

By means of such a procedure, transcription, translation, vocabulary, formal, analytical ethnography, the simultaneous approach could ultimately be reached and verifiable conclusions not dependent upon personal whim, dubious linguistics, unavailable and undocumented material or covert and pet hypotheses could also be had.

Makemson has followed the serial mode of attack. She has included no transcription of the original text, no vocabulary, and seems to have produced a translation which may have literary but not scientific merit. Her comparative basis for the ethnological commentary has been largely confined to *The Chilam Balam of Chumayel* and Tozzer's *de Landa*. As is usual with calendrical students, Makemson has found that the data in the *Tizimin* generally agree with her own correlation; do not agree with the correlations of other students. The Xiu, whom Makemson seems to think are responsible for the majority of the attitudes expressed in the *Tizimin*, are acknowledged by a footnote to be of possible Nahuatl (Toltec) origin, but are generally shown to represent a more or less typical Mayance value system and way of life in contrast to the Itza who, it would seem, are more typically Nahuatl. Makemson depends largely on Roys for information on the Xiu, does not

indicate any knowledge of Tozzer's superb comments on the Xiu in the *de Landa*, does not list Morley's study of Xiu genealogy, but does equate the Xiu with the people of Ix Toloch who are apparently descended from Yaxum, one of the first four ancestors of the Maya according to the *Chumayel*.

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The Ethnobotany of the Kayenta Navaho. An Analysis of the John and Louisa Wetherill Ethnobotanical Collections. Leland C. Wyman and Stuart K. Harris. University of New Mexico Publications in Biology, Number Five. The University of New Mexico Press, Albuquerque, 1951. 66 pp.

"Dr. Wyman has done a tight, careful, thoughtful job for which he is well known . . . ," states Dr. Clyde Kluckhohn in the foreword to *The Ethnobotany of the Kayenta Navaho*. This statement sums up the paper quite nicely and the present reviewer heartily agrees. The material in this paper supplements very well the material previously published by Wyman and Harris in 1941 in *Navajo Indian Medical Ethnobotany*. The specimens used in the present study were collected some 20 years earlier, in a restricted area of the Navajo country within about 50 miles of Kayenta, Arizona. The data here presented were originally obtained beginning in about 1906 by Mrs. Louisa Wade Wetherill, wife of "Hosteen John" Wetherill. She continued gathering data and specimens over a period of nearly 25 years. Her dried and pressed specimens were such that the authors were able to identify all but four of the 310 plants in the collection.

The bulk of the paper consists of a listing of the plants, their place of collection, the Navajo name with its English equivalent and a listing of their use or uses. The plant families are arranged in a modified Engler and Prantl system, that is, the more primitive plants first and the more complex last. These are followed by 10 indeterminable species. For the sake of convenience, the genera within the families have been alphabetized. Following these entries is an alphabetical list of genera. This is a great convenience not only for the general reader but also for the lay botanist who may not be familiar with the place of botanical families in the Engler and Prantl system. Cross references are carefully analyzed in the following section, and then the uses of plants for ceremonies and medicines are listed. Finally there are the sections containing the plants listed in the "Navajo Name List" of Wyman and Harris appearing in their *Navajo Indian Medical Ethnobotany*. The Navajo Name List is by numbers only, whereas the Navajo names for plants are listed in alphabetical order as employed by Reichard in her "Navaho Dictionary." Both of these lists refer to the numbers of the species in the Ethnobotanical List to which they apply.

One of the difficulties in evaluating such a collection of material lies in the fact that the original notes do not seem to be specific enough as to whether or not the information is from one informant only or cross-checked with other informants. If from one informant with individual peculiarities and not cross-checked, then this would account for such a large number of unique uses. This also may be accounted for in other ways. The Navajo have certain classes of plants which can be used in various ceremonies. For instance, if a certain plant is not available in the immediate area or at the particular time of the year when the ceremony is given, the medicine man has a choice of several others which are just as potent. Another reason for the difference in names or usage is the fact that two or more plants, entirely unrelated, may serve the same purpose, or have similar characteristics. There are many items in the Wetherill data that agree with published material and are therefore valuable confirmations from an otherwise unworked area. The agreement of so many items is also a valuable documentation on the distribution of culture traits.

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BOOK NOTICES

Archaeological Excavations in Fiji. E. W. GIFFORD. Anthropological Records 13:3, University of California Press, 1951. Pp. v + 100 (pp. 189-288 of Vol. 13), 18 plates, 4 figs., 7 diagrams, 3 maps. $1.50.

A two-pronged attack has been opened on the prehistory of the western Pacific, attempting to work out, by systematic archaeological investigations, a real time perspective and a valid sequence in lieu of complex and unlikely formulations based purely on traditions and trait distributions. Progress in the northern campaign was reported by Alexander Spoehr at the meeting of the Society for American Archaeology in Evanston, Illinois, on May 12, 1951: "Prehistory in Micronesia: excavations in the Marianas." Dr. Gifford's publication represents an attack farther south, the first archaeological work, so far as is known, ever done in Fiji. It is of interest and a source of quiet pleasure to note that real archaeology is finally being introduced in the western Pacific—by North Americans. Here also might be cited a paper in the Cummings Festschrift volume not listed in E. R. Smith's brief review in the April issue—Carl F. Miller, "Pottery from kitchen middens of Dutch New Guinea" *For the Dean* (Santa Fe, 1950), pp. 277-89 (including four pages of drawings).

Dr. Gifford's report, reflecting careful field work and thorough laboratory analysis, resembles closely in style and presentation the better site reports in North American archaeology, and the materials are not so completely different as might be expected. Especially to Southwesternists, the emphasis on the abundant pottery, including petrographic analysis of potsherds, is familiar; and the remark that "weighing sherds seems to give more accurate statistical results than counting them" (p. 223) has also been made in publications of the Museum of Northern Arizona. The scarcity of stone objects (mostly polished adze blades of dense volcanic rocks) is explained as due at least in part to repeated use. Artifacts of shell were also scarce, although the sites are largely shell middens. An item less familiar to American archaeologists occurs under the heading of mammal bones: "Except for fish, man was the most popular of the vertebrate animals used for food" (p. 208); how frustrating for physical anthropologists!

The Technology of a Modern Stone Age People in New Guinea. BEATRICE BLACKWOOD. Occasional Papers on Technology 3, Pitt Rivers Museum, Oxford University Press, 1950. 60 pp., 17 photographic plates, 19 text figures and 2 maps. 10/6.

This resembles an archaeological report, except that the people (a tribe with the delightful name of Kukukuku) are still alive and the investigator knows what the things are for, sees how they are made and how they are used. The artifacts—including stone adzes, stone bark-cloth beaters, wooden bush-knives, bone awls, bamboo tongs, stone-headed clubs, wooden clubs, bows and wooden-pointed arrows, shields, fire-sawing hearths, bamboo torches, string and netting, aprons and cloaks and ornaments, and bamboo musical instruments—are naturally quite different from those of New World archaeology in numerous ways; yet many of them look not entirely strange, and the descriptions of manufacture and use of various types are extremely stimulating and valuable for archaeologists dealing with materials of a general early neolithic type anywhere. For instance, the smallest bone piercers, fine and sharp, are "used for very delicate work, such as the lancing of boils"; and another bone implement type, blunt ended, is "used for prizing up the binding of adzes to insert the ends of the cane." Neither of these has been mentiond, so far as I recall, among possible uses suggested for objects recovered in American archaeological work in comparable levels of cultural development.

Reports of the University of California Archaeological Survey, No. 11. 32 pages, 3 plates, 1 figure. Includes "A prehistoric Yurok ceremonial site (Hum-174)," ROBERT F. HEIZER, *Papers in California Archaeology 10*, pp. 1-3 and bibl., plate 1; "At the bedrock of history," A. L. KROEBER, *Papers* 11, pp. 5-10 and plate 2; "An archaeological reconnaissance in the Panamint Mountains," D. W. LATHROP and C. W. MEIGHAN, *Papers* 12, pp. 11-25, notes and bibl., plate 3 and fig. 1. University of California, Berkeley, 1951.

A great number of perforated sea-lion skulls, lacking mandibles, on a little conical rock islet off Patrick's Point, in northwestern California, constitute the Yurok ritual site, considered prehistoric because of the finding of a number of similarly perforated sea-lion skulls in the Patrick's Point shell mound (site Hum-118) but of none in a historic village site (Hum-169) in Trinidad Bay. Heizer compares the perforation and special disposal of bear skulls farther north and in northern Asia.

Dr. Kroeber's article, reprinted from *Sunset Magazine* for September 1910, discusses most interestingly materials from Kern County described by E. W. Gifford and W. E. Schenck from their Site 15 in *Archaeology of the southern San Joaquin Valley*, UCPAAE 23-2, 1926.

The third item describes archaeological sites recorded and surface materials collected on a survey in February 1951 of areas in the northwestern part of Death Valley National Monument in cooperation with the National Park Service. Most of the sites appear to represent temporary camp locations of migratory seed-gatherers; most of the artifacts closely resemble modern Paiute or Shoshone and do not suggest any great antiquity. Interesting exceptions are a Southwestern potsherd, brown corrugated and probably Pueblo III (1000-1300 A.D.), and an incised slate tablet resembling Amargosa I specimens described by M. J. Rogers from the Mohave Desert.

Anthropology in British Columbia: No. 1, 1950. British Columbia Provincial Museum, Victoria, B. C., 1950. 45 pp.

This is primarily a status and progress report, a survey of anthropological work in British Columbia, comprising brief summaries on research in progress from the University of British Columbia, the University of Washington, the National Museum of Canada, and the British Columbia Provincial Museum; statements on forthcoming publications and unpublished manuscripts; and a bibliography for 1940-1950. There are also two articles reporting on extensive recent field work—Charles E. Borden, "Preliminary report on archaeological investigations in the Fraser Delta region" (summarized in Dr. Borden's note on "Frazer Delta archaeological findings" in the January issue of *American Antiquity*, Vol. XVI, No. 3, p. 263), pp. 13-27; and J. H. Sewell, "Archaeological remains in central British Columbia," pp. 28-32. This publication is a valuable concise over-all review of current work in British Columbia; issuance of similar or supplementary annual bulletins may be hoped for, and could well be imitated in other areas.

Proceedings of the Alaskan Science Conferences of the National Academy of Sciences, Washington, November 9-11, 1950. Bulletin No. 122 of the National Research Council, Washington, D.C., April 1951. Pp. 216. $2.00.

This conference on research in Alaska was attended by nearly four hundred scientists in various fields who are interested in the problems and opportunities of research in arctic and subarctic regions; it covered anthropology, agriculture, forestry, botany, zoology, geology and geography, geophysics, meteorology, oceanography, physiology, medicine and public health. The section on anthropology, with J. L. Giddings, Jr., as chairman, included the following papers, abstracts of which are presented in this volume, pp. 42-50: "Introductory statement," by Henry B. Collins, Jr.; "Anthropological research in southeastern Alaska," by Viola E. Garfield; "What is happening and what can happen to Alaskan Eskimos," by Margaret Lantis; "Preservation of archaeological and ethnological material in Alaska," by Frederica de Laguna; "Contemporary problems in the anthropology of southern Alaska," by W. S. Laughlin; "Eskimo archaeology in 1950," by Froelich Rainey (an especially valuable summary of current status and major problems); and "Problems of early man in Alaska," by J. L. Giddings, Jr. Papers of outstanding general interest in other sections, though not of direct pertinence to Alaskan archaeology, included several in botany, all those in oceanography and physiology, and a few in zoology. The symposia on "Permafrost," on "Health problems of Alaskan Eskimos, Aleuts, and Indians," on "Relationship of vegetation to physical environment," and on "Sea ice" are of especial interest and value. The "General Meeting," pp. 126-64, and "Closing Session," pp. 166-88, are concerned chiefly with exploitation of resources. The final recommendations of the Alaskan Science Conference include establishment of scientific information centers and field research centers, and of coordinating committees, including a special committee on Alaskan anthropology to survey needs and possibilities for field research and to act as a clearing house and advisory committee to governmental agencies, private institutions, and individual scientists on problems of anthropological research, preservation of antiquities, and native welfare in Alaska.

Araucanian Culture in Transition. MISCHA TITIEV. Occasional contributions from the Museum of Anthropology of the University of Michigan, No. 15, Ann Arbor, 1951. Pp. xii + 164, 17 plates, 9 text figures, 2 maps. $2.50.

Dr. Titiev, author of *Old Oraibi*, spent about five months in Chile in 1948, investigating culture changes among the Araucanians. The study throws light on various important features of cultural dynamics. "As the forces of change continue to manifest themselves people grow hesitant and uncertain and often become dispirited and maladjusted . . . the sense of shame does not necessarily engender complete willingness to abandon traditional customs. The net result is a series of compromises whereby old traits are modified rather than lost or replaced by totally different new ones . . . Above all, it is apparent that the process of culture change is slow, nonsymmetrical, all-pervasive, and cumulative. It operates not so much by the sudden displacement or elimination of established traits, as by means of a series of successive modifications . . . Inertia may slow down the process somewhat, but in the end enough trait alterations are effectuated to make the traditional culture unrecognizable" (pp. 151-2). The breakdown and maladjustment under the impact of Western European culture, discussed in this and other studies, are of course far more drastic than anything to be expected in earlier periods of American Indian history ordinarily studied by New World archaeologists, but they are of interest to us not only as representing the final phases of that history but also as showing how acculturation works, what happens to peoples and cultures under given circumstances.

The North American Buffalo. A critical study of the species in its wild state. FRANK G. ROE. University of Toronto Press, 1951. 957 pp. $12.00.

This massive monograph is an impressive compilation of data, with original and frequently admirable interpretations on many points. The discussion of the range of the buffalo is of the most interest for American historians and archaeologists. Historical sources cited are, at least for the Southwest, not always the best available and give far from complete coverage. The conclusions reached are nevertheless essentially correct, I believe, although rather indefinite for New Mexico and Arizona. There evidently were no bison west of the Rio Grande, and very few west of the Pecos River valley, in

the historic period—by the sixteenth or seventeenth century—and, as Roe indicates, none in Nevada and California. The archaeological findings, of which Roe and most biologists writing on this topic are not generally aware, suggesting the presence of bison in western New Mexico and Arizona, date back for the most part to the 1200's or earlier. The documentary evidence for buffalo in Coahuila or Chihuahua in the historic period is at best scanty.

Dr. Roe is justifiably dubious of the accepted idea that the type locality of *Bison bison* is "Mexico" (p. 16), but he quotes with only an implied reservation the legend of Montezuma's bison allegedly seen by Cortes in the zoo in Mexico City on the conquest of the Aztec capital in 1519 (p. 206). As I point out in a forthcoming note,* that story seems to be unfounded and the type locality of the American bison should properly be placed in the southern United States.

Of special interest also, the chapter entitled "The influence of the buffalo environment upon Indian mentality" argues with considerable logic that Plains tribes were essentially nomadic buffalo-hunters before the seventeenth century introduction of the horse. The 34 appendices include, among many interesting topics, "Buffalo ritualism in Indian life," "Indian stone rings and pound sites," and other ethnological incidentals.

The Cheyenne in Plains Indian Trade Relations, 1795-1840. JOSEPH JABLOW. Monographs of the American Ethnological Society XIX. New York (J. J. Augustin), 1951. Pp. ix + 100, 2 maps. $2.50.

The history and activities of the Cheyenne are examined as exemplifying economic relationships among Plains Indians, with changing roles of different groups in the complex of intertribal trade as affected by changing historical circumstances, and with effects of trade on intratribal changes, and as an instance of successful transition from a sedentary horticultural pattern to the nomadic buffalo-hunting way of life. In moving out from their earth-lodge villages of the 1700's and earlier in Minnesota and eastern North Dakota and becoming horsemen, "typical Plains Indians," by 1800, the Cheyenne assumed a key position as middlemen in transmission of horses northward from New Mexico, and of European goods by way of the Missouri. The monograph discusses the introduction of the horse and its effects, the creation of new needs by the fur trade, changes in patterns of life, trade systems in the Plains, and effects on intertribal relations. Dr. Jablow concludes that the Plains tribes became so interdependent as to be seen as pursuing technologies functioning primarily within the larger framework of a trading economy, that centralized tribal authority was reinforced by the trade system, and that the importance of the horse was in large part as a medium of exchange and an instrument of production.

Acculturation and Material Culture I. GEORGE I. QUIMBY and ALEXANDER SPOEHR. Fieldiana — Anthropology, Vol. 36, No. 6, Chicago Natural History Museum, July 17, 1951. Pp. 41 (107-147). $1.00.

Analysis of thirty-eight museum specimens reflecting the contact of the native cultures of North America and Oceania with Western European civilization, and recording processes of cultural change; classified under the headings A-1, New types of artifacts introduced by trade or otherwise; A-2, New types of artifacts copied from imported models but reproduced locally of native materials; A-3, New types made locally but partly from imported materials; A-4, New types of artifacts manufactured locally with new introduced techniques; B-1, Native types of artifacts modified by the use of imported materials; B-2, Native types modified by the substitution of imported materials whose use involves new technological principles; B-3, Native types modified by the introduction of a new element of subject matter or meaning. A possible additional category of native types, made locally of native materials adapted to new uses, is not treated. Examples of each category are pictured, in most cases along with the corresponding traditional forms, with explanatory captions; a short concluding discussion points out that form tends to show considerable stability, especially as compared with material; that forms are generally more stable than required by function and related motor habits, are evidently *per se* resistant to change.

These Are the People. Some notes on the Southwestern Indians. ALICE MARRIOTT. Laboratory of Anthropology, Santa Fe, 1949 (actually issued 1951). 67 pp., 10 photographic plates, 2 maps. Limited edition, 1000 copies, autographed. $3.00.

A nicely produced little guide for tourists, covering briefly the colorful Southwestern landscape, archaeological and historical background, and general description of the Pueblos, the Navajo and Apache, and the Yuman and Piman tribes, discussion of contemporary arts and crafts, a calendar of Indian fiestas and dances, including hints on proper behavior by visitors, a list of places of interest, and a reading list of general books. The photographs, mainly provided by the New Mexican State Tourist Bureau, are very good; the maps are merely reproductions of Arizona and New Mexico state highway maps. Not particularly suitable for the special edition idea, this little book would have been fine as an inexpensive item for tourists.

The Story of Pueblo Pottery. H. MARIE WORMINGTON and (photographs by) ARMINTA NEAL. Museum Pictorial No. 2, Denver Museum of Natural History. Denver, 1951. 64 pp., with 55 photographs, 2 maps (end papers). $0.50.

A pleasing treatment, well written and excellently illustrated, of this perennially popular subject; intended for a general audience and of value to students.

* Reed, Erik K., "The myth of Montezuma's bison and the type locality of the species," accepted for publication in the *Journal of Mammology*, Vol. 33.

NOTES AND NEWS

GENERAL

There are a number of interesting and significant EARLY MAN items this quarter, again presented together under that heading. Historical excavations are mentioned under SOUTHEAST (Georgia, Florida) and referred to in the special subsection on the Iroquois Conference; see also Harrington's review of *Here They Once Stood*. No new radiocarbon dates have been brought to our attention, nor have we any new materials in tree-ring work to report at this time.

In line with these subsections, however, is the discussion of another promising method of dating, prepared by the Assistant Editor for Early Man, presented below. This is quite different from the attempts to use degree of mineralization, which is not a dependable criterion at all, except for relative age within a single locality; see various recent papers emanating from California, by S. F. Cook and Robert Heizer, detailing a subject outlined in a preliminary discussion by Alex Krieger some years ago: "Chemical alteration of archaeological remains," SAA *Notebook*, June 1940, pp. 126-135; and for an example of rapidity of fossilization, such as has also been noted in Florida and South Texas, see Kenneth W. Vinton, "Unusual petrification in tropical Panama," *Scientific Monthly* LXXII-6, June 1951, pp. 397-400. An additional reference on radiocarbon dates is: Helmut de Terra, "Comments on radiocarbon dates from Mexico," pp. 377-88 in *Homenaje al Doctor Alfonso Caso*, Mexico, 1951, discussing those given in Memoir 8. Another pertinent paper of general nature overlooked for October issue (Vol. 17, No. 2, p. 175) and not cited in *Memoir 8* is: E. C. Anderson and W. F. Libby, "World Wide Distribution of Natural Radiocarbon," *The Physical Review*, Vol. 81, No. 1, Jan. 1951, pp. 64-9, a highly technical but undoubtedly important little item.

The interesting and important general paper discussed by Krieger in the section on EARLY MAN in the last issue has now appeared: Hugo Gross, "Mastodons, mammoths and man in America," Texas Archaeological and Paleontological Society *Bulletin* 22, pp. 101-31, Lubbock, Texas, 1951. In the same volume there is also a paper which should be added to those cited in *American Antiquity*, Vol XVI, No. 3, January 1951, p. 284—A. R. V. Arellano, "Some new aspects of the Tepexpan Man case," pp. 217-24. Another newly published paper, on which we can confidently expect rather definite comments from general students and from specialists in early man, is: George F. Carter, "Man in America: A Criticism of Scientific Thought," *The Scientific Monthly LXIII*, No. 5, November 1951, pp. 297-307.

The new hall on "Indians of Western North America" at the Los Angeles County Museum was completed and opened in September. The large new three-story wing being added to the Denver Museum of Natural History is well under way; the first floor is to be a "Hall of Man," with miniature dioramas depicting prehistoric man in various parts of the world, as well as exhibits of artifacts, pictorial maps, etc.

A paper of considerable interest which may not come to the attention of many archaeologists is: W. Ralph Singleton, "Inheritance of corn grass, a macromutation in maize and its possible significance as an ancestral type," AECU-1165, U. S. Atomic Energy Commission, Technical Information Service, Brookhaven National Laboratory, Oak Ridge, Tenn., May 1, 1951 (6 pp., 12 photographs). "Corn grass is a monogenic dominant type of maize that arose by a single macromutation. It has narrow leaves, many tillers, and under field conditions almost never sheds pollen. It can be propagated asexually, and seed is distributed over the plant in many small ears containing but a few seeds each. Several of these characters are those which might be expected in an ancestor of maize" (from abstract, p. 1).

The possible significance of domesticated plants with reference to New World origins and contacts continues to receive attention. A short paper in the Caso volume by Isabel Kelly, "The bottle gourd and Old World contacts" (pp. 207-14 in *Homenaje al Doctor Alfonso Caso*, Mexico, 1951), summarizes the general information presented by Thomas W. Whitaker in "Lagenaria: A pre-Columbian cultivated plant in the Americas," *Southwestern Journal of Anthropology* 4:49-68 (No. 1 Spring), Albuquerque, 1948, and calls attention to the significant additional find of bottle gourds in a very ancient context at Huaca Prieta on the coast of Peru. Another such case is that of *Lagenaria* remains reported from an early cave association in southwestern New Mexico recently excavated by Paul Martin and John Rinaldo of the Chicago Museum of Natural History. Miss Kelly also remarks on the occurrence at Huaca Prieta of beans other than *Phaseolus* species, either *Dolichos* or *Canavalia*, and the interesting problem of the grain amaranths. The important study by Jonathan D. Sauer, *The Grain Amaranths: a survey of their history and classification* (Annals of the Missouri Botanical Garden, Vol. 37, 1950), will be reviewed in an early issue of *American Antiquity*; of incidental interest also is J. D. Sauer, "Amaranths as dye plants among the Pueblo peoples," *Southwestern Journal of Anthropology* 6:412-15 (No. 4, Winter), 1950.

Another recent ethnobotanical paper restates the American, specifically Brazilian, origins of *Ananas*—J. L. Collins, "Antiquity of the pineapple in America," *Southwestern Journal of Anthropology*, 7-145-55 (No. 2 Summer), 1951. Finally, an interesting instance of introduction of an originally American crop plant among an Indian group by European agency in the historic period is discussed by Wayne Suttles, "The early diffusion of the potato among the Coast Salish," *Southwestern Journal of Anthropology*, 7-272-88 (No. 3, Autumn), 1951.

GEOCHEMICAL DATING

Of particular interest to all archaeologists is the emergence of what promises to be another important chronological tool, namely the geochemical method being developed by V. P. Sokoloff of the Isaiah Bowman School of

Geography, Johns Hopkins University, and his colleague, George C. Carter. The following quotations are from a letter dated Sept. 4, 1951, from Sokoloff to Paul C. Fejos; a copy was supplied the Assistant Editor for EARLY MAN for inclusion here:

"The geochemical technique is in part a technique and in part a philosophy, a by-product of my geochemical exploration in Australia in 1948-49. It is essentially an adaptation of known colorimetric procedures for determining small fractions of one-part-per-million of copper, zinc, lead, gold, and other metals in soils, rocks, plants, and other natural bodies. The adaptations consist in both refinement and simplication of known methods, so as to enable the worker to obtain results economically and rapidly . . . using portable apparatus. The philosophy of the method is an outgrowth of the chemistry of weathering and of the geochemical cycles of the elements. . . ."

A midden site 2 miles northeast of Albany, Georgia, on Highway 19, was visited by Sokoloff, Carter, and Arthur R. Kelly in 1951. The midden occupies an old terrace cut by Chinchifoonie Creek, with exposed profiles 200 cm. deep. The profile contains a great thickness of a senile soil, overlain by midden, which in turn is overlain by 40-50 cm. of agricultural soil; charcoal-stained soil in the middens is about 150 cm. deep, with pits extending much deeper. The older middens are believed to be pre-pottery. Sokoloff comments on this site as follows:

"I simply compared the distribution patterns and, of course, the magnitudes of the trace metals in the midden profiles with the blank, *i.e.*, normal" distributions of the same metals in a non-midden terrace of the same kind and age, all other things being comparable. The interpretation is to the effect that the Chinchifoonie midden is at an equilibrium with the dissipating environment, *i.e.*, both the magnitudes and the patterns of the trace metals in the midden are the same as in the blank. This is a most unusual experience for me. The middens, some of which are of considerable age, constitute geochemical anomalies as a rule, with respect to their trace metals. It is not impossible to state yet at which particular rate the geochemical equilibrium is reached in the present climate of Georgia. My opinion is that the more ancient part of the Chinchifoonie midden is outside the Carbon 14 range and may well be 100,000 years old or so."

A. R. Kelly has for some years been interested in the "rotten flint" artifacts found in certain circumstances in Georgia, all the indications being that such disintregration of flint represents a respectable antiquity. In this connection Sokoloff remarks that:

"The utter state of weathering and alteration of the more primitive flint artifacts is without a precedent in my experience. In contrast with this, the technologically advanced artifacts made of the same kind of stone are practically unaltered. The alteration appears to be chiefly a hydration of the silica, its partial solution, and its re-precipitation in and on the artifacts. Scarcity and nature of the iron stain on the older artifacts suggest a mild climatic change intervening somewhere in the midden sequence."

Carter adds that "we took samples from more normal locations of middens of fiber-tempered and grit-tempered pottery horizons. We also have samples of geological materials of ages 0 years, 10 years, ca. 100 years, ca. 1000 years, ca. 10,000 years, etc. We hope to be able to establish rates of weathering and then be able to fit archaeological sites into a 'weathering scale.' Like tree-rings, there would have to be a series of regional scales."

A. R. Kelly's University of Georgia summer field school worked in limestone caves in north Georgia, "nice, roomy affairs filled with a characteristic red clay and contoured, water-eroded limestone." This red clay was also examined by Carter and Sokoloff, Carter comparing it to Lagoa Santa cave geology in that both soils represent a long period of formation. The analysis is to be continued.

EARLY MAN

In the course of an archaeological survey in the Northwest Territories, Richard S. MacNeish of the National Museum of Canada located an old beach site on the western end of Great Bear Lake. He reports one projectile point of the Plainview type, three suggestive of Plainview, two ovoid knives, three flake scrapers, one chopper, and three unidentifiable fossil bone fragments from this site. He also reports a Plainview point from just north of Yellowknife on Great Slave Lake, and others in collections made in Saskatchewan and Manitoba. Boyd Wettlaufer, also of the National Museum of Canada, conducted a survey of the southern parts of Alberta, Saskatchewan, and Manitoba, making extensive collections which include Folsom, Plainview and "Yuma" (Scottsbluff?) points.

The River Basin Surveys reports that during the summer Richard D. Daugherty of Washington State College worked an apparently early site in Lind Coulee, Washington. Bison bones have been identified but the species is so far unidentified. Stone implements consist of flake and keel scrapers, and four projectile points of the same shape, namely a roughly triangular blade and long broad stem. According to Frank H. H. Roberts, Jr., these points suggest early forms, and sufficient burned bone has been collected for radiocarbon testing. Near Cold Spring, Oregon, Joel Shiner of the River Basin Surveys has discovered a small occupation zone beneath volcanic ash. A primitive hunting and gathering complex is suggested, and both charcoal and burned bone have been obtained for radiocarbon testing.

M. R. Harrington reports that a joint expedition of the Southwest Museum and University of California at Los Angeles spent two months at the Stahl site near Little Lake, Inyo County, California, during the summer. Four more house sites outlined with postholes were found, all belonging to the Pinto period, the only identifiable artifacts found in them being points of the Pinto and Lake Mohave-Silver Lake types. Old tree holes in the hard-

pan under the Pinto deposit reveal that the vicinity was then heavily timbered, in contrast to the present treeless desert; pluvial conditions are indicated. Harrington objects to the term "Pinto-Gypsum Complex" which has occasionally been used, pointing out that no Pinto points appear at Gypsum Cave, and no Gypsum Cave points appear among the hundreds of Pinto points at the Stahl site. The combined "complex" was based entirely on surface finds alone. A brief report describing the four hut outlines has appeared: M. R. Harrington, "Latest from Little Lake," *Masterkey* XXV: 188-191, No. 6—Nov.-Dec., 1951; and a separate accompanying note on the evidence of contemporaneity of the forest, Barbara J. Lucas, "Tree-holes at the Stahl site," *Masterkey* XXV-6, pp. 191-193.

Richard Forbes of Columbia University, in cooperation with the American Museum of Natural History and the State University of Montana, conducted excavation in the MacHaffe site near Helena, Montana, during the summer. The site revealed a three-fold stratification of lithic cultures, the lowest level containing Folsom fluted point fragments, scrapers, and other artifacts. Above this was about six inches of sterile soil, and above that a deposit containing several complete Scottsbluff type points and a considerable number of other chipped-stone artifacts. Still higher in the deposit there were medium-sized, stemmed projectile points and other artifacts.

In Colorado, Arnold Withers of the University of Denver and Charles B. Hunt of the U. S. Geological Survey are conducting a joint archaeological and geological study of the Denver area. A gravel fill along the South Platte Valley, derived from late Wisconsin glaciers in the Front range, may correlate with the Dent, Colorado, deposits where Clovis Fluted points were associated with mammoth remains. In the Denver area these deposits have yielded split camel and *proboscidea* bones, charcoal, and irregularly chipped stones. East of the South Platte the uplands are blanketed with eolian deposits derived from the glacial outwash along the river. Camel and *proboscidea* bones, some split, also occur in the lower part of these eolian deposits and on the unconformity beneath.

Overlying these sands are younger eolian sands tentatively assigned to the Altithermal age. A Woodland site is found on an alluvium younger than the sands; this post-Altithermal but pre-Woodland alluvium may eventually be correlated with the Calamity and Tsegi formations of Texas and Arizona, respectively. In the Denver area this alluvium has yielded abundant charcoal, a milling stone, and various non-diagnostic artifacts. It was followed by arroyo cutting, a still younger alluviation, and the post-1890 arroyo cutting.

For the fifth successive summer, the University of Nebraska State Museum conducted excavations in the Medicine Creek Reservoir area. In 1951 this work was partly supported by National Park Service funds and was under the direction of E. Mott Davis. At the Red Smoke site (FT-42), a cliff exposure of late Pleistocene sediments, eight occupational levels were isolated. A campsite containing Plainview points constitutes one of the middle levels, but the others have not produced any clearly diagnostic material. C. B. Schultz, Director of the Museum, reports that bison bones from the Plainview component compare favorably with *B. antiquus*. The Museum staff as a whole is continuing its correlative studies in late Pleistocene deposits with those of Rocky Mountain glaciers to the west and continental glaciers to the north and east.

Fluted projectile points found in deep levels of Graham Cave, Missouri, are mentioned below in the discussion of that site under "Northern Mississippi Area."

William J. Mayer-Oakes of the Carnegie Museum, Pittsburgh reports a possible early man site in the banks of Monongahela River near Elizabeth, Pa., with three thin occupation levels. The uppermost, 18-24 inches below the surface, produces typical late prehistoric materials; the middle level, 56 inches beneath the surface, has the earliest pottery for this region and steatite sherds; and the deepest level, 39 inches beneath the middle level, has chert flakes, heat-cracked rock, one crude scraper, and charcoal. The Carnegie Museum has instituted a recording of all fluted points in the Upper Ohio Valley, numbering 24 to date.

T. M. N. Lewis and Madeline Kneberg, University of Tennessee, have published the preliminary results of a survey of fluted points from Tennessee, the first state survey of this kind (Tennessee Archaeologist, Vol. VII, No. 1, 1951). One of the results has been to recognize what appears to be a distinctive type, separate from the now well-established Folsom and Clovis fluted types. The Tennessee form is long and very narrow, with strongly incurved edges resulting in a "fish-tail" proximal end, and the fluting commonly extends almost to the tip. Of 59 fluted points recorded to date, 18 conform to this description (*op. cit.*, Pl. I, fig. 5; Pl. II, figs. 2, 8, 10, 12; Pl. IV, figs. 9, 10, 11, 12; Pl. V, figs. 1, 7, 9, 10, 12, 13).

William E. Edwards has spent the last two seasons at a stratified site in central eastern Florida, locating a leached brown sand deposit which can be correlated with the Melbourne formation at Melbourne and Vero, Florida. This deposit includes projectile points "resembling those of Clovis and even more closely those of the Plainview site," an unusual stemmed point, a variety of scrapers, and small, simple knives. A distinct stratum containing fiber-tempered pottery overlies the brown sand.

A fluorine analysis of human and animal remains from different levels of the Vero site has been undertaken by the University of Florida with aid from the Wenner-Gren Foundation for Anthropological Research, Inc. The Florida Geological Survey and Dr. E. H. Sellards of the Texas Memorial Museum are cooperating.

Oswaldo Menghin of the Museo Etnográfico, Universidad de Buenos Aires, conducted a field trip to Patagonia, January to March, 1951. He reports a rudimentary stone industry from several sites, typologically similar to that at Chou-kou-tien. Although they are surface finds,

ine industry could be isolated from other lithic industries at Estancia La Generosa, on the southern slopes of the mountains of Rio Deseado, Gobernacion de Santa Cruz. On the Estancia Tico in the same area, caves were found with paintings of hands, animals, guanaco, and symbolic figures. On the northern side of these mountains, on the Estancia Los Toldos, 10 caves containing paintings were found. Excavations in cave 2 showed five layers; (1) volcanic ash; (2) 15 cm. of cultural remains; (3) 40 cm. of alluvium; (4) 30 cm. of cultural remains; (5) 70 cm. of alluvium. The volcanic ash was identified by Dr. Vaino Aüer as from the first cycle of postglacial eruptions in Patagonia. The lowest cultural layer included a pressure-flaked knife and two lance points with wide stem and no barbs, very similar to those found by Junius Bird at the bottom of caves in southern Patagonia; also three bone awls, a large round scraper, a well-polished mano probably used to grind paint, fragments of ochre, fragments of a polished stone plaque with red paint streaks, and many bones including a fossil horse tooth. The use of coloring materials suggests that these people made the pictographs.

The upper cultural level contains a simpler lithic industry, comprised entirely of flakes with retouched edges; strangulated blades are almost identical to those of the middle Aurignacian of Europe. At depths of 90 to 150 cm. in cave 3 are two horizons with abundant carbon and artifacts typologically like those of cave 2, upper level, but in general larger and cruder.

ARCTIC

The National Museum of Canada continued the investigation of an archaeological site on Cornwallis Island at Lat. 75°N. Long. 95°W., by William E. Taylor, begun in 1950. Taylor corroborated the occurrence of both Thule and Dorset cultures here, with Dorset probably the older.

PACIFIC NORTHWEST

Douglas Leechman, senior archaeologist of the National Museum of Canada, worked in the southern interior of British Columbia during the summer. His purpose was to define the limits of distribution of the interior plateau culture, which appears to extend to southern Yukon Province. Geological estimates of 5,000 years have been made for this culture at the northern extremes. Leechman also investigated the distribution of semi-subterranean houses and contact between cultures of the interior and the Pacific Coast.

Charles E. Borden, University of British Columbia, conducted an archaeological survey of the Tweedsmuir Park area of British Columbia this summer, inspecting approximately 400 miles of lake and river margins and locating 130 sites. More than half of these were small, briefly-occupied camps for fishing, berry-picking, or the gathering of pine tree cambium. Subterranean storage pits were present at many sites. 25 sites scattered over the area seem to have served exclusively for storing and concealing provisions. As many as 12 cache pits were found on some of the small lake islands. 36 circular semi-subterranean house pits were found. The pits usually occurred singly, rarely in pairs or groups of three; however, at one site—on Euchu Lake—a cluster of 7 circular house pits suggested a village community. Nearby, on the same lake, was an apparent village group of at least 6 rectangular house pits, smaller than but apparently similar to the rectangular houses at Chinlac, an old Carrier village site on the Stuart River, investigated by Borden in 1950. The relationship between circular and rectangular houses in Central British Columbia is a problem which needs solving.

The western and central areas of Tweedsmuir Park were marked by a paucity of artifacts although chipping detritus was present at most camps; the eastern area yield was much greater. Distributed over virtually the entire Tweedsmuir Park area were scrapers, knives and projectile points of basalt and obsidian, more rarely of chalcedony, jasper and chert; at one very large site on Natalkuz Lake, however, the most common raw material by far was a buff to reddish rhyolite. This rhyolite industry contrasted sharply with the other because of the larger size and the extremely rude manufacture of the implements. Rhyolite is easily available in most parts of the park area, but the only other localities where evidence of this rhyolite tool complex was found were on the southern shore of the lake directly opposite the type site and again about six miles slightly southwest on the north shore of Euchu Lake. Whether this is a lithic industry which is distinct from that of recent Carrier groups in the area, and whether there is any special significance in the peculiarity limited north-south distribution of rhyolite tools, as compared with the over-all east-west distribution of basalt and obsidian implements, are problems which can be solved only by more intensive field work.

Douglas Osborne, University of Washington, directed the University of Washington–National Park Service excavations in the McNary Reservoir during the summer. 7 house pits of a large village site on Strawberry Island near the mouth of the Snake River yielded few artifacts but provided some data on the relationships between burial and habitation sites on the Columbia. Excavations at two other island sites near the confluence of the Snake and the Columbia gave definite evidence of two distinct periods with different burial complexes.

L. S. Cressman, University of Oregon, continuing work on Klamath Indian sites, excavated two small middens and a large house pit measuring approximately 18 meters in diameter and just over 2 meters in depth. The artifacts found were very few but supported the evidence from earlier digs of dependence on a fishing and seed-using economy. A large number of timbers, some fragmentary and burned, was found in the house pit. The floor was saucer-shaped, as has been the case with all the houses excavated in this area. The Oregon Coast Survey, under Cressman's direction, has been completed from the Columbia River to Cape Blanco, south of the Coos Bay area.

William S. Laughlin, University of Oregon, and Viola Garfield, University of Washington, attended the second Alaskan Science Conference, held at Mt. McKinley National Park Sept. 4-8. Dr. Laughlin presented a paper on "Eskimo Antiquity in Southern Alaska," and Miss Garfield spoke on "Southeastern Alaska Indians, Borrowers or Inventors."

NORTHEAST

A considerable body of significant new archaeological data for the northeastern area was unearthed during the 1951 field season in Ontario, New Brunswick, New England, New York and western Pennsylvania. As a result, a more comprehensive picture of the broader areal interrelations is emerging, together with a more detailed knowledge of the culture sequence and relative chronology in several portions of New England.

The Robert S. Peabody Foundation of Andover, Massachusetts, according to Douglas S. Byers, "sent out two crews to continue the Northeastern Archaeological Survey in the summer of 1951. During the winter, Theodore L. Stoddard, Jr., made an exhaustive survey of the literature dealing with eastern Maine and New Brunswick, gathering references to historic Indians and the location of sites. This information supplements data secured by field examination in 1949 and 1950. In June, Mr. and Mrs. Stoddard commenced examination of sites around Cobscook and Passamaquoddy bays in Maine and New Brunswick. Aided by the resourceful researches of Isaac W. Kingsbury and other friends in the area, the Survey gathered information concerning more than 75 sites . . . 40 of these were examined critically. Only 8 were deemed worth intensive excavation, a fact which bears witness to the extensive coastal erosion proceeding in the region . . . there seems to be some stratigraphic and typologic justification for dividing the prehistoric occupation of the area into two periods. So far, these periods can be differentiated by mutually exclusive assemblages of artifacts. Two such assemblages were found in a stratified site on the Dennys River in 1950. There, the older level is characterized by an absence of pottery, two ground slate bayonets of 'Red Paint' type, several large pecked tools, and a unique type of broad-based side-notched point. On the salt water, this period probably is represented by several sites (including 'An Early Occupation Site, Eastport, Maine' by Isaac W. Kingsbury and Wendell S. Hadlock, *Bulletin of the Massachusetts Archaeological Society*, Vol. XII, No. 2, pp. 22-26), none of which are shell heaps.

" The later period includes the salt water shell heaps and the younger Dennys River level. It is characterized by a ceramic complex which seems to be analogous with Point Peninsula pottery in New York state and Ontario; a variety of chipped stone projectile points, knives, scrapers, and choppers; pecked-and-ground stone axes and adzes; a variety of bone, antler, and ivory objects, including barbed points, awls, flakers, beaver tooth knives, and perforated teeth; and a single tubular copper bead found *in situ* at the bottom of a deep shell heap. None of the earliest, nor any of the late types of pottery found elsewhere in the northeast have yet been identified at Passamaquoddy Bay.

"300 New Brunswick sites have been recorded as a result of the Survey's previous work in 1949 and 1950, together with an exhaustive review of published references. Anyone who has unpublished information concerning this area is urged to communicate with the Peabody Foundation.

"Because examination of existing collections and recent work by the New Hampshire Archaeological Society seem to indicate that western coastal Maine, southern and eastern New Hampshire, and northeastern Massachusetts appear to have been occupied by peoples whose stone artifacts and ceramics have many traits in common and which are rather different from comparable traits of central and eastern Maine, it was decided to send out Mr. and Mrs. Howard R. Sargent to undertake work in New Hampshire for the Northeastern Archaeological Survey. They proceeded to extreme northern New Hampshire and worked south. If any sites existed on the extreme northern Connecticut River, they have been destroyed by damming, flooding, or lumbering. Occasional finds of artifacts have been made in the area between Colebrook and Lancaster, but they represent stray objects, perhaps lost by people traveling or hunting. No sites showing evidence of occupation were found there. A number of locations that appear to be favorable are buried under deep blankets of silts that seem to be of rather recent origin. Along the Connecticut River, between Haverhill and Lyme, there is scattered evidence of sites. In the vicinity of Lyme there are a number of sites, one of which may be non-ceramic, and another of which appears to be a site of late prehistoric time, allied to the Oswasco horizon of New York, situated well back from the valley and in the hills.

"Dams have raised the water level of the lakes at the headwaters of the Androscoggin River so that sites which were located at narrow places between lakes of the Rangeley chain are now under several feet of water. A collection formerly made at one of these—between lakes Cupsuptic and Mooselookmeguntic — includes grooved axes, gouges, celts, a bannerstone, and fragments of pottery of middle to late style, as well as projectile points, knives and scrapers. Umbagog Lake has also been dammed, but the water level has not been raised as high as it has in others. A site was discovered at what is known as Moll's Rock on the west shore of the lake. 'Moll' is probably Mollocket, or Mollylocket, reputedly the last of the Pequakets, who made the pouch illustrated in Willoughby ('Antiquities of the New England Indians,' Fig. 138, p. 257). The site, which has been much disturbed by a former logging camp, and by persons digging for worms or relics, appears to antedate Mollocket by many years. There is reason to believe that a non-ceramic horizon exists on the undisturbed sandy gravel which underlies the site. It yielded corner-notched points and one side-notched

point, knives, large scrapers, and a drill, but no pottery. The disturbed zone—black to brown loam—yielded small flake scrapers, drilled stone tubes, rubbing stones, whetstones, choppers, one triangular point, celts, plummets and hammerstones. A man who was caretaker at the camp found arrowheads, knives, a semi-lunar knife, grooved axes, adzes, and slate projectile points. Forms found in the underlying zone were also found in the loam, but pottery was found only in the upper zone. It appears here that traits of the non-ceramic period—some of which are reminiscent of the 'Red Paint' horizon—persist into a later period when pottery of the general Point Peninsula tradition was made. This corroborates evidence found near Ellsworth Falls, Maine, at Wasp Island and the Smith Farm.

"One point is worthy of note. Chipped stone implements from Moll's Rock appear to belong to a tradition commonly found in southeastern New England, distinct in many particulars from the tradition of central and eastern Maine and New Brunswick."

The Warren King Moorehead Chapter of the Massachusetts Archaeological Society continued for the sixth season excavations on the large and prolific Titicut site in Bridgewater, Mass., under the directorship of Maurice Robbins. The most notable feature disclosed this season was a large, oval, pit-like area of occupation, some 35 x 22 feet in size, containing at various depths, hearths, small pits, charcoal and shell deposits, and numerous implements. Among these were two large steatite pots, "killed" *in situ*; a two-holed gorget, also ceremonially broken; long side-notched projectile points, and other artifacts. Several cremated burials and deposits of implements in red ochre have also been found at this site, offering strong evidence of linkage with the Orient culture of eastern Long Island which Ritchie believes was intrusive there from lower New England.

Of considerable interest is the fact that the new pit-like feature, situated at the western end of the site at the base of an esker, was covered by an unbroken layer of heavy gravel, a foot or more thick, which is believed to have resulted from solifluxion and to be of considerable age. Charcoal samples from the hearths may reveal a date for this period of occupation of the site.

In Rhode Island, excavations have been completed on the Twin Rivers site on West River, a tributary of Providence River, by the Narragansett Archaeological Society, under the direction of William S. Fowler. In addition to evidence of three cultural occupations previously determined, a fourth horizon has now come to light in the form of small stone hearths resting on glacial gravel at the base of the deposits, which consist of eolian sand mixed with later humus accumulations near the surface, to a total depth ranging from 10 to 20 inches.

In one of the hearths was found a small, well-made, stone gouge with a high-ridged grooved poll. Two forms of projectile points occur in this zone, both having a concave base and prominent barbs or "ears." One specimen is channeled part way up both faces and apparently belongs in the category of eastern fluted points.

The New Haven Chapter of the Archeological Society of Connecticut, as reported by Irving B. Rouse, "continued its excavation at the Grannis Island site in New Haven Harbor under the direction of Lyent W. Russell. Additional evidence was obtained to correlate the founding of the site with a period when the sea level was lower than at present. There is some indication that the original culture may have been preceramic, but sufficient data are not yet available to demonstrate this point.

"The Willimantic State Teachers College carried on its second season of excavation at the Main site near Norwich, Connecticut under the direction of Mrs. Eva L. Butler. The ceramics found here range through the entire Windsor sequence from North Beach to Niantic. So far, no traces have been found of the Shantok series, although the type site for the latter is diagonally across the Thames River."

Two institutions and a number of non-professional archaeologists were active in New York state during 1951. In June, a party from the Rochester Museum of Arts and Sciences, led by Alfred K. Guthe, excavated on a site within the village limits of Westfield, Chautauqua County, N.Y. Nine pits yielded a series of potsherds, stone artifacts and charred corn. This material will be studied in connection with the large collection obtained from this site by Ross Pier Wright and sons in the hope that the complex assemblage can be interpreted for publication. Evidently basically prehistoric Iroquois, the Westfield site shows relationships with late Woodland occupations in western Pennsylvania, eastern Ohio and southern Ontario.

A small campsite on the west shore of Seneca Lake, Seneca County, N.Y., was also examined and found to produce pottery of late Point Peninsula and early Owasco character, some sherds showing transitional features. Weathered argillite points previously found there were traced to an earlier source on higher ground, from which it is believed they were carried by erosion into the more recent deposits.

The New York State Science Service and State Museum conducted excavations on six sites of several periods of culture in eastern, central and northern New York. William A. Ritchie was in charge of the party which included Charles E. Gillette, Charles A. Denman and Leonard G. Wood. At a site in the middle Hudson Valley, early Woodland points and blades of semi-lozenge shape were found in and below a shell layer. A much larger station of Laurentian (Archaic) age was excavated in the upper Hudson Valley producing a stone congeries (plus a native copper projectile point) which links this region with adjacent New England rather than with adjacent New York.

On the Oneida and Seneca rivers in central New York sites of the Point Peninsula culture were excavated to enlarge the scope of knowledge of the development of this culture. A deep and stratified shore midden at Jack's Reef produced a prolific sherd series in particular, pertaining to the late stages (Focus 4). An overlying shell stratum yielded Owasco sherd material.

A discovery of extraordinary interest was made on the Indian River in Jefferson County, where six large burned stone features were identified as crematories. Nearby there occurred cremated burials and remarkable offerings of grave goods in red paint deposits. In one of these occurred 200 thin, leaf-shaped, cache blades, some broken in the crematory fire. Other objects from these offertories comprised a copper flaking tool still in the carved wood handle, preserved by the copper; copper and stone adzes; a gorget; a large, "killed," ceremonial knife of smoky chalcedony; fire-making sets; numerous chipped flint projectile points, drills and scrapers; whetstones; lumps of galena; and shell and copper beads. As a result of this find it is now possible to show a relationship between the Point Peninsula 2 focus and the Glacial Kame culture of Ontario and elsewhere.

At the western end of New York state, the Buffalo Museum of Science sponsored an excavation on the Goodyear site, in the town of Elma, Erie County. Miss Marian E. White was in charge of the operations which uncovered, in an area measuring 30 by 40 feet, over 200 postmolds evidently of superimposed lodges of still indeterminate form and size. Pottery and triangular points and other artifacts from this site, previously found by Miss White, point to an Iroquoian occupation, possibly of Neutral provenience, on the late prehistoric and protohistoric time level. An outstanding contribution to Ontario archaeology, particularly to a developmental sequence apparently leading to basic Iroquois, was made by Frank Ridley of Islington, continuing his researches at the Frank Bay site on Lake Nipissing, the presumed village of the Nipissings as marked on the Galinee map of 1670. Here he has opened a new trench which revealed strata disclosing a parallel culture and land deposition, suggesting that the beach, now only 4 feet above high water level of Lake Nipissing, had been under construction during the many years of occupancy. The earliest artifacts, all more than two feet below present water level, consist of a few large quartzite scrapers and two roughly flaked knives. Above this horizon lie successively 9 distinct occupation levels, all ceramic-bearing, 7 of which can be identified with the specific pottery types of whole village sites in south-central Ontario.

These horizons are, consecutively: (1) Point Peninsula, of which there are sites at Lake Scugog and Balsam Lake; (2) transitional Woodland, found also at Lake Scugog, Rice Lake, and the Uren site; (3) a second form of transitional Woodland bearing an extremely flared and rolled rim which occurs at Lake Scugog; (4) early and progressive types of Uren pottery as found at Uren and the Barrie sites; (5) Webb-Middleport ware as found on those and the McCrae site; (6) Lalonde type pottery and related artifacts as found on the numerous Lalonde culture sites; (7) one fragment only resembles a prehistoric Huron type. The uppermost layer, representing some 6 inches of the topsoil, well illustrates the historic period Huron inventory as present on mission sites of Huronia. This fact suggests that if the site has been correctly identified historically, the late seventeenth century Algonkian Nipissing and the Huron of the same period shared a very similar material culture.

The National Museum of Canada continued reconnaissance work in southern Ontario, in the vicinity of Lake Huron and Georgian Bay, under Thomas E. Lee. Many important sites, some of them preceramic, are reported.

In western Pennsylvania, William J. Mayer-Oakes, representing the Upper Ohio Valley Archeological Survey of the Carnegia Museum, reports that a survey of the Erie, Pa., area revealed 30 sites, of which one, the Wintergreen Gorge earth circle, was tested. As in the New Wilmington area, the bulk of the surface evidence indicated early prepottery sites. During September laboratory and field research on West Virginia archaic sites was continued and a preliminary report was prepared for the *Archeological Newsletter* of the Carnegie Museum. Mr. and Mrs. Mayer-Oakes will resume their survey of the upper Allegheny basin during October and November.

NORTHERN MISSISSIPPI VALLEY

MINNESOTA. Recent archaeological work in this state reported by Lloyd A. Wilford include excavations of varied types. In a gravel pit on the Cannon River, two miles above its mouth, skeletons had been found by the Highway Department in 1948. This summer the edge of the pit was tested for further burials. Though several pits were found, all proved to be storage and refuse pits with no skeletons. The pottery was of the Silvernale culture, the type site of which is at the mouth of the river, three miles above Red Wing.

A mound on the Minnesota River two miles below the type site of the Cambria culture had been partially destroyed years ago and was about to be leveled. This mound was dug as a salvage operation and yielded two fairly complete skeletons and parts of others, rather shallowly buried on the back with legs fully extended. A small, crude, mortuary pot, shell-tempered and with perforated lug handles was present. The pot is so atypical as to make it uncertain whether it is Cambria or Oneota.

A portion of the cave on the St. Croix River, seven miles above the village of Marine-on-St. Croix, was excavated and yielded a deposit of cultural material five feet in depth, with pottery in all but the lowest layers. The pottery was all Woodland, resembling the Howard Lake and Mille Lacs types. The cave is sixty feet above the river and the ascent is difficult. An intermittent campsite is suggested, the deposit consisting largely of fallen rocks, sand, charcoal, ashes, burned earth, clam shells, and fish bones. The lowest levels would seem to be in the archaic horizon.

A large mound three miles south of Marine-on-St. Croix yielded bundle burials on the mound floor. Three feet above these and just below the surface was another layer of bundle burials. A large rock cairn occupied

the east side of the mound, reaching nearly to the surface. A quantity of pottery and a few artifacts were in the mound fill. The pottery was of the Mille Lacs type. In front of the mound on the bank of the river (St. Croix) a rather rich village was hidden. A section of this was tested and the pottery proved to be predominantly Oneota. The mound is obviously older than the Oneota occupation as no Oneota sherds were found in the mound fill. An Oneota village this far north is somewhat unexpected.

MISSOURI. Stephen Williams of Yale University and Edward Scully of the University of Michigan conducted a two and a half month survey during the past summer in southeast Missouri locating sites and making numerous stratigraphic excavations in sites which indicated the possibility of fairly long habitation. They were successful in locating quite a number of sites with ceramic material indicative of a temporal placement in pre-Mississippi ceramic levels and also located a number of sites on the western margin of the Mississippi flood plain which suggest preceramic occupation. Along the St. Francis in Dunklin County several sites indicated an extension of the St. Francis complex from Arkansas into southeastern Missouri. The eastern border of Pemiscot County contained materials almost identical to the Pecan Point-Walls complex of Arkansas and Mississippi indicating the extension of the complex into southeast Missouri. The project was a part of the Mississippi Valley program of the University of Michigan Museum of Anthropology, designed to obtain a bird's-eye view of culture history in this central Mississippi area.

The University of Missouri Fifth Summer Field Session in Midwestern Archaeology was held in the Table Rock Reservoir area in Stone County, on White River, the first four weeks. Reconnaissance of about one-third of the area was completed and 57 sites were located. Thirteen of these were bluff shelters. Surface collections obtained from the sites indicate a fairly wide variety of chipped stone work, but little else. The sites can be separated roughly into three groups as follows: (1) those on which shell-tempered pottery sherds were found (handles and flat circular bases were present), (2) those on which very small stemmed projectile points and ground-stone celts were found, and (3) those yielding large projectile points but no pottery or ground-stone objects. The samples obtained were for the most part too small to be of much value in a comparative study. Almost continuous rains, floods, and a cover of luxuriant vegetation hampered the progress of the survey. A report of the work is in preparation and will appear in the next issue of *The Missouri Archaeologist* (Vol. 13, No. 2).

The last four weeks of the Field Session were spent in the further excavation of Graham cave, an ancient site near Mineola in central Missouri. The method of excavation was the removal of deposits in five foot square blocks to check stratification. After the blocks were isolated, profiles were cut on three sides and the block was removed by natural levels. Three levels of occupation were evident. The top level contained grit-tempered, brush-marked sherds which compared favorably with the late Hopewell types in central Missouri. The second and third levels contained no pottery. Fluted projectile points were found in the lowest level. Samples of charcoal, split and charred animal bones, and shells were obtained from the lowest level (some six feet below the present cave floor and lying on the original floor of the cave) and were turned over to the University of Michigan for radiocarbon dating. Work is being continued in the cave intermittently this fall under the direction of Carl H. Chapman with the aid of members of the Missouri Archaeological Society. A report on previous work there, *Graham Cave—an Archaic site in Missouri*, by Wilfred D. Logan, has been selected for publication as Memoir No. 2 of the Missouri Archaeological Society, we learn from the Society's *News Letter* No. 51 (October 8, 1951). Logan found in the bottom levels of Graham cave a distinctive form of Archaic point with side notches, concave base, and smoothed edges, as well as fluted points, we understand. The Missouri Archaeological Society is currently seeking to raise funds to publish this important memoir, an effort deserving support—any contributions may be sent Prof. Carl E. Chapman, 15 Switzler Hall, University of Missouri, Columbia.

OHIO. During the 1951 season the Ohio State Museum carried on excavations of two Adena-type mounds in central Ohio. The work was under the direction of Raymond S. Baby assisted by Robert M. Goslin.

The Cordray site, located in the Dillon Dam area, is situated on a low terrace along the Licking River, six miles east of Newark, Ohio. Excavations revealed fourteen burials covered by a primary mound. Skeletal fragments of an equal number were recovered from an old excavation made into the top of the mound several years ago. A tubular pipe, cache of leaf-shaded blades and a miniature clay vessel were among the artifacts associated with the burials. Students from Ohio State University, New York City College, West Liberty State College and Bryn Mawr College assisted in the work, along with Arthur George Smith of Norwalk, Ohio.

Excavations of the Goldsmith site, located in the Hoover Dam area and situated on the west side of Big Walnut Creek, just north of Central College, Ohio, revealed a postmold pattern of a lean-to type of structure. Potsherds, stemmed projectile points and weed seeds were found in a low mound that covered the post pattern. A few fragments of human remains were recovered from the mound fill. A small group of Ohio State University students participated in the work on a part-time basis.

SOUTHEAST

The 1951 meeting of the Eastern States Archaeological Federation was held in Chapel Hill, North Carolina, October 26-27, at the Laboratory of Anthropology and Archeology, University of North Carolina, with its Director, Joffre L. Coe, in charge of arrangements.

The Eighth Southeastern Archaeological Conference met at the University of Florida, Gainesville, with Dr.

John M. Goggin as Chairman, November 2 and 3. The *Newsletter* of the Southeastern Conference has been happily resuscitated by the original editor, William S. Haag, University, Mississippi; Vol. III, No. 1, the first number issued since March 1941, appeared in October 1951, containing brief summary minutes of the Sixth (September 1941) and Seventh (October 1950) Conferences, and a note on "The Jaketown Flint Industry" which Haag had to dash off, no other contributions having come in to him. We are quite glad he did so.

MISSISSIPPI. William S. Haag of the University of Mississippi reports no field work for the summer other than the completion of the survey on the Grenada Dam Reservoir. The report on the nonceramic artifacts of the Jaketown site is under way.

KENTUCKY. The major effort of the Department of Anthropology of the University of Kentucky during recent months has been the completion of excavation of the Adena burial mound at Dover, on the Ohio River near Maysville. Field work was supervised by Raymond Wilkie and William S. Webb. Considerable cultural material was found, including sherds apparently carried in with mound fill, but the 58 burials were mostly sparsely and simply furnished. The large number of copper bracelets, of which the most massive weighs 300 grams, formed a close parallel to other Adena mounds. Other artifacts were in the Adena pattern.

Beneath the mound there was a scattering of postholes but no house pattern. A bulldozer with a 12-foot blade was used with great success in removing the sterile mound top and in backfilling. Little damage resulted and work was done much more economically than by hand labor; even with no previous familiarity with archaeology the operator grasped quickly what was expected and worked with great effectiveness. At present the preparation of the report is under way by Webb and Woodbury. Webb is also working on a report of the Jonathan Creek site, in Marshall County, near the Tennessee River in western Kentucky.

At the end of January 1952, Dr. Webb retires as head of the Department of Anthropology (and also of Physics) at Kentucky, with the expectation of having more time to devote to archaeological work.

GEORGIA. Ocmulgee National Monument officially opened, on November 2, the newly designed rotunda and exhibit hall containing forty-eight exhibits. These consist of general introductory cases on anthropology and archaeology as well as detailed exhibits on the six occupations of the Macon Plateau. A special effort has been made to connect the archaeological material with the European history of Georgia. Opening ceremonies included a dance and stick ball game by Creeks from Okmulgee, Oklahoma.

The National Park Service plans to conduct a six-weeks excavation at Fort Frederica National Monument on St. Simons Island in the fortified village of Frederica. The hope is to excavate two of the original land lots and determine exactly the street locations and possibly the locations of two three-story houses once on these lots.

Dr. W. H. Sears, University of Georgia, has continued work at Kolomoki State Park, and reports that the excavation of Mound D at Kolomoki is now completed. The first construction stage of this mound was a small primary mound of village debris scraped over four extended bodies in log lined tombs. Scaffolding was then erected on the mound. Two burials, probably female, were placed in rock tombs in front of the scaffolding, and a male in a log and rock slab tomb off the south side. All was then covered with a special yellow clay mantle, including a disc-shaped high point in the rectangular yellow clay mound over the male burial. A layer of brown earth with a mass pottery deposit was put in front of rectangular mound. Yellow earth was again piled up in a mound with small flat top. A great many single skulls, bundles of long bones, more extended burials, and cremations were deposited as the yellow clay was added. A mass cremation on the flat top was the next stage, and then a final red clay cap. "It has more dead people put into it in funnier ways than any mound in the Southeast" (*Time*, November 12, 1951). Sears and Waring believe it similar to the Natchez-Taensa ceremony, with some elaborations not mentioned in the historical source.

Reports on previous work at this important site have been issued: W. H. Sears, *Excavations at Kolomoki, Season I—1948*, University of Georgia Series in Anthropology, No. 2, Athens, 1951, and W. H. Sears, *Excavations at Kolomoki, Season II—1950, Mound E*, same series, No. 3, Athens, 1951.

The summer field session in archaeology, directed by A. R. Kelly, was operated in Bartow County, near Cartersville, Georgia, and centered on exploration of limestone caves containing burials and artifacts in the caves which seem on comparative studies to be correlated with the Copena culture. Copper "reels," rolled copper beads, bone and shell artifacts, and stone forms are key traits. Pottery associations are with the check-stamped ware with tripodal supports found in north Georgia in the "Cartersville period" (Caldwell) immediately following the Kellogg (fabric-marked or cord-wrapped stick impressed) interval.

A party of George F. Carter, V. P. Sokoloff, of Johns Hopkins University, and A. R. Kelly, en route through south Georgia to inspect Archaic sites in southwest Georgia and Florida, accidentally found an important prepottery site on Route 19, Chinchifoonie Creek, in the outskirts of Albany, Georgia. A deposit, three feet or more in thickness is exposed in the road cuts of a new highway recently put through a hill at this point. Worked flint, heavily decomposed, and artifacts occur in the exposed profile. The site is discussed further under GEOCHEMICAL DATING, above.

The River Basins Surveys, represented by Joseph R. Caldwell, started investigations in late August at the Lake Spring site on the Savannah River above Augusta,

Georgia. The project was a cooperative one sponsored by the Smithsonian Institution, the University of Georgia, and the District Engineer of the Corps of Engineers. The site presumably includes a prepottery and the beginning of pottery-making periods and is comparable to Stallings Island. Investigations there should add to and strengthen the evidence obtained from Stallings Island. Unfortunately, it probably will not be possible to complete the excavations at the site because, after heavy rains upstream, it is covered by water and will be permanently flooded by December of this year.

FLORIDA. The Department of Anthropology and Archaeology at Florida State University has added to its staff an ethnologist, Dr. Robert Anderson.

Recent archaeological work in the Tallahassee area includes excavations in the Hall Mound, a test excavation in the basement of an 1840-60 house located at the site of a new bus station, and a survey of the Horseshoe mound.

Recent field work of the Archaeological Survey of the Florida Park Service includes a salvage excavation of the Gard mound (see Ripley P. Bullen, "The Gard site, Homosassa Springs, Florida," The Florida Anthropologist, Vol. IV, Nos. 1-2, May 1951, pp. 27-31), and test excavations at the famous Crystal River site. At the latter site evidence for a long occupation was found, starting in early Santa Rosa-Swift Creek times, continuing into Weeden Island, with scattered indications of Safety Harbor. Other work has included writing reports based on the field notes of work in Hillsborough and Jefferson counties done under WPA auspices in 1935-37, and previously unpublished. The report on the fiber-tempered Cotten site in Volusia County has been completed and awaits publication.

The National Park Service plans this winter to excavate at the location of the 16th century Huguenot site of Fort Caroline, near Jacksonville. Charles Fairbanks will direct the work.

ARKANSAS. The University of Arkansas conducted its second annual archaeological field session this past summer in connection with the study of the Caddo Indian at the University Museum. Four students spent eight weeks surveying and excavating some 27 sites along the Little Missouri and the Ouachita rivers in south central Arkansas.

One very interesting site was found at Calion, Arkansas, where a lumber company was built on an excellent Poverty Point type site, so only a few feet of undisturbed material was found. Dr. Clarence Webb was present at the time of excavation and aided in the identification of the material. One feature was a cache of six large stone celts similar to celts found at the Poverty Point site and at Belzoni, Mississippi.

EASTERN OKLAHOMA. The advance salvage excavations by the University of Oklahoma, under a research contract with the National Park Service, in the Eufaula Reservoir project area on the South Canadian River were completed by Donald B. Proctor in early October.

SOUTHWEST

J. Charles Kelley, sponsored by Southern Illinois University and a grant from the American Association for the Advancement of Science, made a three-weeks' site reconnaissance in Chihuahua last August. Kelley covered a 125-mile stretch of Rio Conchos between Julimes and Falomir, a rugged country in which the Conchos cuts through many high ranges, with small valleys between. Sites were plentiful on terrace remnants along the river and quite uniformly revealed hearthstones, charcoal, flint chips, end-notched pebbles, and plain brownware like that of the Concepcion focus of the Rio Grande Valley to the east. Alluvial exposures were also recorded, terraces being up to 45 feet thick and showing up to three depositional periods. Occupation zones were found to a depth of 12 feet below surface, but no identifiable artifacts found. Ring middens and other small campsites were observed in nearby higher valleys. No digging was done on this rapid reconnaissance through rough country. Kelley notes that place names of the Spanish entradas of the 1580's are still in use, enabling a detailed tracing of the route followed; and that despite the great difficulties of unguided travel the entradas followed the most efficient—fastest and easiest—route, presumably guided by Indians who knew the trail well.

During the summer of 1951, the University of Illinois field school in cooperation with the Museum of Northern Arizona spent six weeks working on the problem of the Cohonina culture of northern Arizona. The camp was located on the east flank of Mt. Floyd, between Ashfork and Seligman, north of U.S. Highway 66. Nine students directed by John C. McGregor excavated a number of Pueblo I structures. Decorated pottery resembled that of the contemporary Anasazi. One large partially burned house shed much light on the basic pattern of Cohonina architecture, an interesting combination of large and small rooms with walls made of elaborately constructed wattle and daub. It is believed that these sites represent permanent homes of the Cohonina, in contrast to those excavated in 1949, 35 miles to the east at Red Lake and Red Butte, north of Williams which are regarded as temporary. Study of all artifacts was completed at the Museum of Northern Arizona before return to Illinois.

The results of the University of Arizona archaeological studies during the summer at Point of Pines, San Carlos Indian Reservation, are summarized by E. W. Haury as follows: (1) Continued for the third season the excavation of a pit house village of the Mogollon culture dated in the early centuries of the Christian era. The main architectural feature was a large structure, probably ceremonial, some 40 ft. in diameter. A unique house type consisted of a main room joined to an annex by a banistered ramp. Of considerable significance was the recovery of Hohokam pottery of the Pioneer period. (2) In the largest of the Point of Pines villages, in addition to extensive digging in refuse and rooms, three burned structures were excavated. These

are of special interest because they were occupied by Pueblo immigrants from northern Arizona who brought with them and continued to use for a while a northern ceramic tradition. (3) Excavation was begun in a pueblo occupied briefly to determine the composition of the Tularosa phase in the area. (4) Tests were begun in the flat valley adjoining the main metropolis with the hope of correlating the natural stratigraphy of the valley deposits with the archaeological stratigraphy of the pueblo. The purpose of this is to determine, if possible, what environmental changes there may have been since 1000 A.D. that may explain the abandonment of the region about 1400 A.D.

A deep cave on the Fort Stanton Military Reservation in Lincoln County, N. M., was excavated by a field party of the University of New Mexico led by Paul Reiter. The cave is about 300 ft. long and the fill varies in depth from a few inches to 14 ft. The upper few feet of fill were dry and the lower layers moist. There was a yellow ochre layer in the neighborhood of 3 to 6 ft. deep and in the ochre was a hearth. From the upper layers came several hundred sandals of the "Texas Basketmaker" toe type. From a layer below the sandals and above the ochre came, among other things, a typical Chiricahua point. Two small rock shelters were also excavated, and some salvage work done on the Stanton Ruin which has been enormously disturbed by local archaeology fans.

Plans for winter excavations center at Phoenix. Pueblo Grande, under the direction of Odd Halseth, will start excavations in an eleven-acre plot, adjacent to the Pueblo, which has just been bought by the city. Francis E. Cassidy will assist in the work. Kenneth M. Stewart and his students at Arizona State College, Tempe, will conduct salvage operations at La Ciudad, a Classic Hohokam site in the heart of Phoenix on land which will soon be leveled for a hospital.

David de Harport, Harvard University, completed his site survey of Canyon de Chelly, northeastern Arizona, during the summer, and excavated an interesting pit house there during October—about 5 meters in diameter, round, slab-lined, with only plain gray pottery represented by sherds, no painted ware at all.

The only major National Park Service field work in the Southwest during the fall has been continuation of the excavation and stabilization of Kin Kletso (Yellow House) in Chaco Canyon National Monument, New Mexico, by R. Gordon Vivian of Southwestern Monuments Headquarters. A survey of archaeological sites in Organ Pipe Cactus National Monument, southwestern Arizona, has been begun by Paul Ezell of the University of Arizona as a Collaborator, National Park Service, with assistance from A. H. Schroeder of the Region Three Office at Santa Fe. Otherwise, the National Park Service people have been occupied with preparation of reports, study of skeletal material, stabilization work, River Basin surveys, and other miscellaneous activities.

We learn with pleasure that the State Historical Society of Colorado, Denver, recently received as a gift the Mellinger collection, from Longmont, Colo., of thousands of artifacts gathered principally in southwestern Colorado. The exhibit of the Gila Pueblo Archaeological Collection at the Arizona State Museum, University of Arizona, Tucson, was formally opened November 15. A recent acquisition of the Mesa Verde National Park Museum includes two ordinary digging sticks and a unique (?) two-piece wooden shovel, presumably ancient, from a cave in southeastern Utah.

The eight papers in archaeology and ethnology issued between 1939 and 1947 by the Museum of Anthropology, University of Utah, have been reprinted under one cover in the format of the revived series now called Anthropological Papers of the University of Utah, Department of Anthropology. Those not elsewhere available include: Carling Malouf, "The Gosiute Indians" (Paper No. 3, 1940); Malouf, Charles Dibble, and Elmer R. Smith, "The Archaeology of the Deep Creek region, Utah" (No. 5, 1940); Smith, "An Indian burial, a barbed bone 'projectile point,' and accompanying artifacts from Bear Lake, Idaho" (No. 6, 1942); and Walter D. Enger, "Archaeology of Black Rock 3 Cave, Utah" (No. 7, 1942).

MIDDLE AMERICA

MAYA AREA. Work at Palenque this past season by the Instituto Nacional de Antropología e Historia, under the direction of Alberto Ruz, was largely confined to clearing the Palace, the repair of the Tower, and exploration of the substructure of the Temple of the Inscriptions, where the clearance of the secret vaulted staircase inside the pyramid continues. This is slow work since the shaft had been filled with rock and earth in ancient times. A landing, illuminated by windows at the ends of narrow vaulted shafts, has come to light more than halfway down, and the staircase makes a 180° turn at that point. The bottom has not yet been reached. Clearance of the Palace has brought to view some new sculptures and a throne dated 9.11.0.0.0. A number of yokes and *hachas* were on the floors of late buildings in the Palace. Ruz believes that these and other details point to a late non-Maya occupation of the site. A probable sweathouse with stone bath-plugs in the floor was also excavated.

Repair work continued at Chichen Itza under Jorge Acosta, and at Uxmal and Kabah under Raul Pavón Abreu and Hugo Moedano. At the last site the famous Temple of the Masks is being restored.

At Caracol, British Honduras, Satterthwaite continued his excavations assisted by Horace B. Willcox and Seymour A Nuddle. Additional monuments with sculpture and hieroglyphic texts were discovered, and some twenty tons of such stones were removed. Part of these remained in the museum at Belize; the remainder was shipped to Philadelphia. Under the auspices of University Museum, Paul Beidler, architect, made an accu-

rate elevation and numerous sections of the sculptured stucco work at Benque Viejo, British Honduras, previously referred to in these Notes.

Members of the staff of Carnegie Institution of Washington undertook preliminary work in Yucatan in connection with the new Mayapan project. Stromsvik was occupied most of the year supervising the construction of new quarters at the nearby village of Telchaquillo; a preliminary reconnaissance of house mounds at Mayapan was made by Ruppert and Ledyard Smith; Raymond Thompson spent over six months in Yucatan in a continuation of the Brainerd ceramic project.

A large pyramid and temple, recently discovered at Tikal, was examined by a party from the Instituto de Antropología e Historia de Guatemala headed by Antonio Tejeda and Heinrich Berlin. The structure, including the two-roomed temple and roofcomb, has a height of about 30 m. The most unusual feature is a panel of huge glyphs at the back, extending from the top of the roofcomb to the medial cornice. The glyphs —each at least 40 cm. square—are arranged in six columns of 19 glyphs each, and there are more on the sides of the building. They are of stucco molded on skeleton frames of stone. By means of a makeshift pulley and cage the artists were lowered from the top of the roofcomb to make drawings of the huge glyphs, which, unfortunately, are poorly preserved.

MEXICO. A successful round-table meeting, under the auspices of the Sociedad Mexicana de Antropología met at the end of July at Jalapa, Veracruz, to consider all aspects of aboriginal culture in the state of Veracruz. With great generosity the government of the State of Veracruz paid all expenses of the delegates. An excursion was made to the famous site of Tajin, where, in addition to the important ruins, members saw a series of native dances and an awe-inspiring performance of the famous *volador* ceremony. Many of the delegates also visited the fifteenth century site of Cempoalla, the Totonac site where Cortes lodged. Papers, discussions, and exhibits of the latest discoveries did much to clarify the problems of the complex archaeology of Veracruz as well as its relations to neighboring cultures of Mesoamerica. There were also papers on the related fields of ethnology, linguistics, physical anthropology, and colonial history. A concluding summary by Ekholm of the archaeological discussions successfully welded together the conclusions reached and focussed the attention of the delegates on the outstanding unsolved problems. The success of the meetings was in large part due to the unremitting toil of the organizing secretary, Dr. Davalos Hurtado, and the hospitality and guidance of Messrs. José García Payon, of the University of Veracruz and regional representative of the Instituto Nacional de Antropología e Historia, and José Luis Melgarejo Vivanco, head of the Department of Archaeology of the State of Veracruz. The typological exhibits which they arranged were extraordinarily valuable.

A short series of archaeological meetings were held in Mexico City in September in connection with the fourth centennial celebration of the founding of the University of Mexico. On that occasion Doctors Caso, Gamio, Kidder, and Rivet were awarded honorary degrees.

Donald Brand headed the second Geography field school in Latin America, sponsored by the University of Texas, which spent ten weeks in western Michoacan and adjacent states. Despite the title, the work of the school had a strongly archaeological bias.

SOUTH AMERICA

CARIBBEAN. Irving Rouse informs the Assistant Editor that a three-man party sponsored by the Yale Peabody Museum and the local Museum Commission spent nine weeks between June and August, 1951, conducting a survey and some excavations on St. Croix, American Virgin Islands. The participants were Gary Vescelius and Colin Eisler of Yale and Allen Croft of Harvard. Sixty sites were located and collections were made from about forty of them. Excavations were undertaken at eleven sites. The total collection runs to about 30,000 specimens, and Vescelius, who is working it up, hopes to derive from it a more refined local chronology and some information regarding the obvious cultural relationships between St. Croix and Puerto Rico.

The hurricane of August 17 caused only minor damage to the archaeological collections of the Institute of Jamaica, although the roofs of both the library and the museum were pierced. The collection of Indian skeletal material at the University College was destroyed, however.

VENEZUELA. J. M. Cruxent, Director of the Museo de Ciencias Naturales in Caracas, has been engaged since June in exploring the sources of the Orinoco River with a joint French-Venezuelan expedition. In a letter to Irving Rouse sent in the middle of the summer, he reported finding three archaeological sites with coarse pottery unlike any previously known in Venezuela.

DUTCH GUIANA. Rouse also reports that Peter R. Goethals of Yale University spent six weeks conducting a preliminary archaeological survey of the coastal area around Paramaribo in the summer of 1951. Surface collections were made from several sites and one was tested by excavation. Goethals also studied the collection of Dr. D. C. Geijskes of the Agricultural Station in Paramaribo. The materials reported include skeletal material, pottery, and rare stone axe heads. The pottery is almost exclusively plain ware and represents large vessels, but small numbers of decorated and modelled pieces were also found. Some urn burials have been excavated.

BRAZIL. H. V. Walter has written to Clifford Evans Jr. that he is continuing his excavations in the Mãe Rosa and Eucaliptus Caves in the Lagôa Santa region. Specimens found include chipped axes with ground bits, quartz scrapers, hammer stones, and polished bone points for attachment to arrows. A burial was found at a depth of 5 ft. in the Mãe Rosa Cave. The material from Mãe Rosa shelter is the first almost complete collection of archaeological material of the Lagôa Santa preceramic age unearthed.

ARGENTINA. Alberto Rex González of the Museo de la Plata kindly furnished us with a summary of archaeological activites in Argentina in the first half of 1951. His information on the activities of Dr. Oswaldo Menghin, who is searching for ancient remains in various parts of Argentina, is given in the EARLY MAN section of this department. For the more recent periods, the most important field work done for some years is that of González himself. On a field trip to the area north of La Ciénaga in northwest Argentina, González carried out a dozen stratigraphic tests, the first ever attempted in this area. In almost all the tests, the superposition of the Belén style over that of Barreales was clearly apparent. It looks as though it would be possible to subdivide chronologically the period represented by the Barreales style. In addition to the two pottery types assigned to Barreales in Bennett's review (Huiliche Monochrome and Ciénaga Polychrome), González has found a number of other types which apparently can be sorted stratigraphically. These tests were preliminary to more intensive stratigraphic analysis being carried out in the second half of 1951 on a grant from the Wenner-Gren Foundation. In addition to the stratigraphic tests, the preliminary investigation included excavation of several dwellings of the Belén and Barreales cultures and surface survey of some twenty sites. The dwellings are rectangular in plan and had walls built of perishable materials; they are the first of this type reported for northwestern Argentina.

Antonio Serrano of the Instituto de Arqueología of the University of Córdoba is compiling a comprehensive illustrated manual of northwest Argentine pottery types.

PERU. Two conferences were held in Lima in August, 1951, to commemorate the 400th anniversary of the founding of the University of San Marcos. These were the Primer Congreso Internacional de Peruanistas and the Conferencia de Ciencias Antropológicas, under the direction respectively of Raúl Porras Barrenechea and Carlos Monge. The two conferences ran simultaneously, one in the morning and the other in the afternoon, and members attended both. Wendell C. Bennett, who was one of the North American participants, reports that archaeology was not the outstanding part of the program, although many archaeologists were present and some important papers were read. The great growth of interest in ethnology in Peru in the last twenty years has not been matched with an increase in the number of archaeologists, with the result that archaeology now plays a notably smaller part in Peruvian anthropology than it did.

The following archaeologists attended: Wendell C. Bennett and George Kubler (Yale University); Henry Reichlen and Henri Lehmann (Musée de l'Homme, Paris); G. H. S. Bushnell (Cambridge University); Greta Mostny (Museo Nacional de Historia Natural, Santiago, Chile); Oscar Núñez del Prado and Manuel Chávez Ballón (University of Cuzco); José Eulogio Garrido (Trujillo); Augusto Soriano Infante (Huaraz); Jorge C. Muelle, Pedro Villar Córdoba, Toribio Mejía Xesspe, and Rébeca Carrión (Lima). A round table was organized under Bennett's direction to discuss the relations between highland and coast in ancient Peru. The Museo Nacional de Antropología y Arqueología opened a new exhibit of the materials from its excavations of over 1300 tombs at Ancón. A number of archaeologists who were unable to attend the conference in person have been invited to contribute articles to the proceedings.

REQUEST FOR ASSISTANCE

Hugo G. Rodeck, Director of the University of Colorado Museum, at Boulder, Colorado, is making a study of the realistic designs on prehistoric pottery of the Mimbres Valley, southwestern New Mexico.

In addition to the known collections of this material there is a very considerable quantity scattered about in public and private collections which it is hoped may be included in the present study. Members are hereby asked to notify Dr. Rodeck of any such material. Please do not hesitate to call attention to a collection because it is too well-known or because it may be duplicated by someone else. Even clues or rumors will be highly appreciated and all information will be gratefully acknowledged.

SEVENTH CONFERENCE ON IROQUOIS RESEARCH*

The value of an informal gathering for reporting research accomplished, for stimulating new research, and for integrating methods of related disciplines, was again demonstrated October 5-6-7, when students of the Iroquois met for the seventh year at Red House, New York, to discuss the theme of stability and change in Iroquois culture history. The annual Iroquois Conference, which owes its inspiration to the late F. G. Speck and looks to W. N. Fenton to arrange the program, comprises mainly anthropologists, but specifically ethnologists, archaeologists, linguists, historians, a psychiatric case worker, museum directors, lawyers, a superintendent of Indian affairs—who are either professional or amateur students of some aspect of Iroquois culture. From the principal universities, museums, and research institutions in Canada and the northeastern states, students of Iroquoiana come to Red House Lake for the weekend, without consideration of status. They join no society, pay no dues, and they have happily resisted organization. The place of meeting has contributed enormously to the success of these meetings, and Charles E. Congdon, chairman of the Allegany State Park Commission, issues the invitations and annually proclaims the weather and welcomes the Conference to

* EDITOR'S NOTE: This long report, aside from its intrinsic interest for many readers, exemplifies quite well the operation (and achievement) of the *informal working conference*. Archaeology particularly seems to flourish in such sessions. For whatever value it may have in encouraging other state or regional groups to gather and discuss mutual problems, this statement has been printed unabridged.

the Park. People come to see the wild life and the autumn foliage, and enjoy the hospitality of M. H. Deardorff of Warren, Pennsylvania.

In previous years we tried sectional discussions of research areas, substantive reports of field work, summaries of abstruse topics such as linguistics, a rigorous symposium on a theme, meeting separately and in plenary session, but this year the conference returned to the plan of general sessions interlarded with section meetings, so that everyone could hear the main papers and yet share his problem with a more intimate group having similar interests. Rapporteurs summarized research trends in a final general session. The success of the recent conference depended on the high level of general papers, the plan of conducting the meetings, the quality of personnel in attendance, and tightening up the program.

The conference moved forward on a central theme, which Fenton set in a paper entitled "Stability and Change in Iroquois Culture History" on Friday night. Discussion sought possible indices of stability in linguistics, archaeology, ethnology, and history. Apparently historic contacts have produced rapid change, diversity, and early conservatism in different areas of Iroquoia, the eastern groups remaining most conservative in archaeology and language from early times. The western groups show early change and later conservatism. The theme carried over into the presentation, Saturday morning, of "Iroquois kinship" by Harry Basehart (Goucher), which proved the display piece of the meeting, and was followed by spirited discussion led by F. Lounsbury (Yale). Basehart finds in changing kinship evidence of both historic contact and internal evolution.

While the ethnologists retired to explore possible methods for three related projects in personality and culture by A. F. C. Wallace (Pennsylvania), M. Randle (Brantford), and M. Teicher (Toronto), the archaeologists and historians heard Charles Wray (of Rochester) describe the excavation of historic Seneca cemeteries. If it is true, as J. Witthoft (Pennsylvania Historical Commission) claims, that the Iroquois conferences have changed the face of archaeology in Pennsylvania, New York, and Ontario, we at least note with pleasure application of the direct historic approach to Huron and Iroquois town sites and the beginnings of sociological interpretation of settlement patterns, in which the findings of ethnology are employed to explain what the ground yields. The work of Ritchie (New York State Museum) and his associates in New York is being paralleled by the University of Toronto group for whom Norman Emerson spoke on "Historical Archaeology in Ontario," describing the splendid cooperative endeavor of the staff of the Royal Ontario Museum of Archaeology with amateur scholars of whom Frank Ridley (of Islington), discoverer of the Lalonde pottery complex, which may be ancestral to both Huron and Onondaga, ware, was present to display a magnificent collection of pottery vessels. K. E. Kidd, co-discoverer with Ridley, of the Ossossané ossuary, described by Pere Brébeuf in the *Relations*, shared some observations on ossuaries in general; Kidd is currently studying trade goods as Guggenheim Fellow from Canada.

The Saturday night Indian party, a tradition at the conference, witnessed the Red House premiere of *The Longhouse People*, a documentary film in color, directed by Alan Worgon and produced by the National Film Board of Canada with Iroquois actors from the Six Nations Reserve. The picture appeals to persons familiar with the culture who recognize the people of Six Nations Reserve as represented by Deskaheh (Chief Alex General, Cayuga), George Buck (who sang for the first Fenton album), and Howard Skye. The piece features several conspicuous incidents in Iroquois ceremonialism, including War Dance for rain, the False-faces, and the Hymn to the Dead Chief and the Charge to the New Chief from the Condolence Council. Use of the French flute introduces a malapropism for the reedy note of the native flageolette, but the theme is in keeping with the picture, although its use in the mourning scene is puzzling. The best comment came from Senecas present, who, in characteristic local pride, avowed they could themselves make as good a movie at Allegany.

Using two Seneca informants, Joe E. Pierce, a student of C. F. Voegelin, demonstrated the Indiana method of recording and testing intelligibility of Indian languages, which involves two magnetic recorders, and offers possibilities for translating long ethnological texts. The recorded document is dubbed onto the second machine, stopping at junctures to record parallel strips of English translation. The test can be repeated on several subjects in the same and in distant communities. Lounsbury, addressing the Senecas present in Oneida, showed how similar results can be achieved without the apparatus, if the linguist knows one other related language.

A substantial number of persons remained for the Sunday morning session to hear the rapporteurs summarize progress in ethnology and in archaeology. Martha Randle pointed up the relation of several research projects in ethnology to the theme of the conference. A drift away from studies in ceremonialism and more conservative topics may be noted; Basehart's kinship study links Morgan with the present; and three current projects approach personality and culture. Investigating ambitions of children at Six Nations Reserve, Randle finds no significant differences in aims of children from Longhouse and more acculturated families. Wallace's projected study of the life and times of Handsome Lake, the prophet, may entail divising new TAT's to employ situations arising in Longhouse life, possibly patterned after native Indian drawings. Teicher's study at Deseronto represents pioneer work in the most acculturated Iroquois community.

Besides the trends already noted in archaeology, Witthoft, seconded by historians and archaeologists present, suggested featuring ethno-history at the next conference, an area in which archaeologists want help. What are the critical means of deciding where a town mentioned in the records is located?

The chairman then turned to Lt. Col. E. P. Randle requesting a private estimate of the crucial administrative problem in the affairs of the Six Nations to the solution of which a team of anthropologists and others might make a significant contribution. Representative government, though nearly thirty years old at Six Nations Reserve, has failed to gain the support of more than a minority of the population, and the hereditary council of chiefs, which went underground in protest against the Indian Act of 1924, remains the governing body of the Longhouse people seconded by a faction of Christians called the Mohawk Workers who otherwise withdraw from active participation in the life of the community. The people of Six Nations unite on one issue only—the integrity of their "Nation" and the preservation of their lands. In common they fear enfranchisement. What is the real basis of factionalism? How is factionalism related to the process of acculturation? What can be done toward producing unity in such a situation? What lessons does the history of the last generation at Six Nations Reserve hold for the administration of native peoples, and more important, what lessons does it hold for predicting the outcome of contacts between the great powers and peoples of so-called underprivileged areas? Here is an example of what administrators may expect wherever native cultures are suppressed in the name of progress. Here is a laboratory for training students in the behaviorial sciences.

The Iroquois Conference will continue on its present informal basis so long as present personnel desire to meet and share interests. It was decided, however, to go ahead with an *ad hoc* committee to explore ways and means of forming an Institute for Iroquois Research to get support for larger cooperative projects, to administer fellowships for the development of social scientists in the field of its interests, and to center its resources and activities in one of the institutions already identified with Iroquois research.

William N. Fenton
Bureau of American Ethnology
Smithsonian Institution

SALE OF COPIES OF THE GATES EDITION OF THE DRESDEN CODEX ACQUIRED BY THE UNIVERSITY MUSEUM, PHILADELPHIA

The Gates edition of the Dresden Codex was published by the Maya Society, Baltimore, in 1932. It consists of a short introductory essay (a paper-bound pamphlet of eight pages), a tabulation of reference numbers printed on a card, and seventy-four sheets or plates printed in color and mounted on nine linen strips folded fan- or screen-wise. In addition to these plates of reproduced Maya glyphic and pictorial material, the strips also carry printed "chapter" headings in English. These are by Gates. The eleven physically separate items were boxed. The edition, in this form, is out of print.

In 1949 a number of sets of the unmounted plates together with copies of the Introduction and the Table were acquired by the University Museum, University of Pennsylvania, by gift from Edith R. McComas, sister of William Gates and, since his decease, President of the Maya Society. The intention of the donor, and of the Museum, is that these be made available to institutions and libraries and to individuals likely to make use of them in teaching and research, and at a price covering only the estimated cost of handling, incidental expenses and should mounted sets be offered, the cost of mounting.

The chapter headings are missing, and substitutes have been prepared by the multilith process. For recipients of the loose plates, instructions have been prepared for mounting in the original manner, as published by the Maya Society, or, alternatively, on a single linen strip. Sets in loose form are now offered for sale to libraries and institutions at $5.00. Since the number available is limited, the Museum reserves the right to refuse orders when it appears unlikely that the sets will actually be mounted and thus be preserved and made readily usable. Orders should be accompanied by a statement of intention to mount the plates promptly, as originally intended by Dr. Gates. Orders from individuals will be filled in order of receipt, but only when and if it becomes apparent that libraries and institutions will not exhaust the supply.

Something should be said concerning proper limitations on the use of the set as a scientific tool. Referring to it, among others, we have the following from the greatest living Mayanist: "All (facsimile) editions are very rare, and in default of them, the reader is advised to use the accessible edition by Villacorta and Villacorta (1930). The various editions published by Gates should be avoided because of the casting of the glyphs in type, a treatment which greatly reduces their value for students. Gates also restores glyphs, usually without any indication of the fact. The Kingsborough version of Dresden has some value for checking damaged glyphs, because it was copied half a century before the first Forstemann (facsimile) edition" (J. Eric S. Thompson, *Maya Hieroglyphic Writing: Introduction*, p. 26).

The Villacorta edition lacks color and the plates are bound in book form so that complete passages cannot be spread out for viewing at one time. Because of this I think the Gates edition is much superior as a tool for explaining the general nature and function of the manuscript to beginners, despite Thompson's justified criticism of it. As a tool for fresh research it can be very useful, but any important conclusions resulting from its use should be checked against a facsimile edition, hard though it may be to find one. The "Instructions for Mounting" include data facilitating such checks.

Linton Satterthwaite
University Museum
Philadelphia, Pa.

THIRTIETH INTERNATIONAL CONGRESS OF AMERICANISTS

On the invitation of the Royal Anthropological Institute, accepted at the New York session in 1949, the International Congress of Americanists will hold its Thirtieth sesssion at Cambridge, (England) from 18 to 23 August, 1952. Accommodation will be provided by one or more colleges of Cambridge University. Subscriptions for full membership will be $8.82. Checks should be made payable to the *International Congress of Americanists*, and sent to the Joint Secretaries of the Organizing Committee, International Congress of Americanists, c/o University Museum of Archaeology and of Ethnology, Downing Street, Cambridge, England. Circulars giving full particulars will be issued later this year.

The date of this Congress has been arranged in consultation with the organizers of the International Congress of Anthropological and Ethnological Sciences at Vienna so as to permit those who so desire to attend both congresses.

* * *

Among the published definitions of prehistory are the following (The Spectator, February 9 1951, London):

> The cradle of the human race rocked by the mother of invention; the darkness of creation illuminated by the light of conjecture; the art of using the unverifiable to deduce the unwarrantable about what probably never happened; the study of the incredible by the credulous; man monkeying with honest apes; history minus historians; the relaxation of the grave; flat skulls by high brows; jaws on jaws by the chinless; what nobody knows about people who never existed; an excuse for talking imaginatively about one's ancestors; and the reconstruction by the imaginative of unimaginative circumstances.

Archaeologists can take consolation in the thought that sociology fared no better, for among the definitions were:

> The study of busy people by busybodies; the study of the imponderable by the ponderous; the study of human beings by inhuman beings; and the investigation of complex groups by people with group complexes.

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